ALTERNATIVE MONITORING PETITION FOR THE SOLID-LIQUID INCINERATOR

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October 2005
Revision: 7.0

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1.0 INTRODUCTION

Eli Lilly and Company (Lilly) operates a rotary kiln incineration system located at the Lilly Tippecanoe Laboratories in Lafayette, Indiana. The rotary kiln is referred to as the solid-liquid incinerator. The solid-liquid incinerator is used to burn hazardous and non-hazardous solid wastes and hazardous liquid wastes. The solid-liquid incinerator is subject to requirements of the hazardous waste combustor maximum achievable control technology (HWC MACT) rule under 40 CFR 63 Subpart EEE and the General Provisions under 40 CFR 63 Subpart A.

The HWC MACT places considerable emphasis on continuous monitoring for demonstrating compliance with applicable emission standards and operating parameter limits. As such, facilities are required to install continuous emission monitoring systems (CEMS) that continuously monitor and record emission data and continuous parametric monitoring systems (CPMS) that continuously monitor and record operating data. Section 63.1209(a)(5) of the HWC MACT allows facilities to petition the Administrator under Section 63.8(f) of the General Provisions to use CEMS for compliance monitoring for particulate matter, mercury, semivolatile metals, low volatile metals, and hydrochloric acid/chlorine gas in lieu of complying with corresponding operating parameters. Section 63.8(f) of the General Provisions allows facilities to request approval of an alternative monitoring petition to use alternative CEMS to demonstrate compliance with the applicable MACT requirements. In addition, Section 1209(g) of the HWC MACT allows facilities to submit an application to the Administrator to request approval of alternative monitoring requirements to document compliance with operating limits monitored by parametric instruments.

As required by the HWC MACT, Lilly will install and operate a CO and O_2 CEMS to demonstrate compliance with the CO emission limit, corrected to 7% oxygen. Lilly is also proposing to install and operate CEMS for multi-metals, particulate matter, and HCl to demonstrate attainment with the semi-volatile metals, low-volatile metals, mercury, particulate matter, and HCl/Cl_2 emission limits. Pursuant to Section 63.1209(a)(5) of the HWC MACT, Lilly will not be required to use CPMSs to continuously monitor operating parameters identified in Section 1209 of the HWC MACT when CEMS are used to demonstrate compliance with the metals, particulate matter, and HCl/Cl_2 HWC MACT emission standards. However, when the CEMS are not in use, Lilly will operate CPMSs to monitor and demonstrate compliance with the corresponding operating parameter limits (OPLs) to avoid shutting down hazardous waste feed to the solids-liquids incinerator. Table 1 provides a summary of which HWC MACT standards will apply while operating the alternative CEMS (CEMS mode), and which operating parameter limits will apply when a CEMS are not in use (parametric mode).

Lilly submitted an earlier version of this Alternative Monitoring Petition to EPA in conjunction with the Comprehensive Performance Test Plan in September 2003 to address alternative requests under Section 40 CFR 63.8(f) *Use of an alternative monitoring method* and 40 CFR 63.1209(g*) Alternative monitoring requirements other than continuous emissions monitoring systems (CEMS).* EPA responded to the majority of the parametric monitoring requests under 40 CFR 63.1209(g) in a letter dated February 27, 2004 which was signed by George T. Czerniak, Chief of the Air Enforcement and Compliance Assurance Branch, EPA Region 5. Therefore, those Section 1209(g) parametric monitoring requests formerly in Section 4.0 of this document addressed by EPA's February 27, 2004 letter have been removed from this revision of the Alternative Monitoring Petition.

2.0 ENGINEERING DESCRIPTION

The key components of the solid-liquid incinerator are described below. The Comprehensive Performance Test (CPT) Plan for the solid-liquid incinerator provides a more detailed engineering description of the incinerator.

2.1 KEY COMPONENTS

The following are the key components of the solid-liquid incinerator:

Waste Feed System – The waste feed system is designed to feed solid and liquid wastes to the rotary kiln, and liquid wastes to the secondary combustion chamber (SCC).

Rotary Kiln – The rotary kiln is a refractory-lined cylinder that rotates while incinerating solid and liquid wastes.

Wet Ash Handling System – Hot, dry ash from the rotary kiln is cooled and has moisture added in the wet ash handling system.

Vertical Up-Flow SCC – The combustion gases from the rotary kiln enter the SCC which is designed to complete the combustion of the gases from the kiln, and to burn primary liquid (high BTU content) and secondary liquid (low BTU content) wastes.

NO_x Abatement System – The hot combustion gases enter the selective non-catalytic reduction (SNCR) system which uses urea injection to reduce NO_x emissions. The NO_x Abatement System does not meet the regulatory definition of a low or a high-energy wet scrubber and the operation of the NO_x abatement system is not regulated by the HWC MACT regulations.

Quench – The combustion gases from the NO_x abatement system enter the quench where the combustion gases are cooled to their adiabatic saturation temperature. The quench is not designed nor intended to be an air pollution control device. The quench does not meet the regulatory definition of a low or a high energy wet scrubber and the operation of the quench is not regulated by the HWC MACT regulations.

Condenser/Absorber – The combustion gases from the quench enter the condenser/absorber where the gases are cooled to below their adiabatic saturation temperature. The condenser/absorber provides additional conditioning of the combustion gases exiting the quench. The condenser/absorber is considered a low energy wet scrubber according to the HWC MACT regulations

Hydro-Sonic™ Scrubber – The combustion gases from the condenser/absorber enter the Hydro-Sonic scrubber where particulate and metals are removed from the combustion gas stream. Removal of acid gases is also provided. Steam injection can be used to enhance the particulate removal. The Hydro-Sonic scrubber is considered a high energy wet scrubber according to the HWC MACT regulations

A block flow diagram of the solid-liquid incineration system is provided in Figure 1.

2.2 SYSTEM OVERVIEW

The incineration system is designed to combust solid as well as primary and secondary liquid wastes. Solid wastes are fed through the solid waste feed system on the rotary kiln. Liquid wastes can be fed to both the rotary kiln and SCC. The combustion gas from the treatment of the wastes is treated in a wet air pollution control (APC) system consisting of a NO_x abatement system, a full quench, condenser/absorber, Hydro-Sonic scrubber, and stack. An induced draft fan is the combustion gas prime mover.

The function of the quench is to adiabatically cool the combustion gas via saturating water sprays. The quench consists of a vertical, cylindrical, brick-lined chamber. Fresh and recirculating water is sprayed through quench nozzles to adiabatically saturate and cool the inlet combustion gas.

Saturated combustion gas from the quench enters the lower portion of the condenser/absorber. Combustion gas flows up through the packed section. Recirculated water is introduced to the top of the packed section and flows countercurrent to the combustion gas flow for additional combustion gas cooling and conditioning.

Combustion gas from the condenser/absorber flows to the Hydro-Sonic scrubber. The Hydro-Sonic scrubber removes fine particulate matter by inertial impaction. Particulate removal efficiency is a function of the pressure differential across the Hydro-Sonic scrubber. The differential pressure is dependent on the flow of combustion gases and water through the Hydro-Sonic scrubber. The combustion gas flow changes with changes in the incinerator conditions. The water flow to the Hydro-Sonics scrubber is a combination of recirculated water and makeup water. Steam injection can be used to enhance the particulate removal of the Hydro-Sonics scrubber.

An induced draft (ID) fan draws the combustion gas through the combustion chamber and APC system and discharges the gases through an FRP (or equivalent) stack constructed with sampling ports and platforms.

3.0 CANDIDATES FOR ALTERNATIVE MONITORING UNDER §63.8(f)

Lilly intends to install and operate a particulate matter CEMS, a multi-metals CEMS, and an HCl CEMS to demonstrate compliance with the particulate matter, metals, and HCl/Cl_2 HWC MACT emission standards. As previously stated, Section 1209(a)(5) of the HWC MACT allows Lilly to petition the Administrator under Section 63.8(f) of the General Provisions to use CEMS for compliance monitoring for particulate matter, mercury, semivolatile metals, low volatile metals, and hydrochloric acid/chorine gas in lieu of complying with the corresponding HWC MACT operating parameter limits. As required in Section 63.8(f), this application must contain a description of the proposed alternative monitoring system and address the four elements contained in the definition of monitoring in Section 63.2 of the General Provisions. Those four elements are as follows:

1) Indicator(s) of Performance: The parameter or parameters you measure or observe for demonstrating proper operation of the pollution control measures or compliance with the applicable emissions limitation or standard. Indicators of performance may include direct or predicted emissions measurements and may be expressed as a single maximum or minimum value;

2) Measurement Techniques: The means by which you gather and record information of or about the indicators of performance. The components of the measurement technique include the detector type, location and installation specifications, inspection procedures, and quality assurance and quality control measures;

3) Monitoring Frequency: The number of times you obtain and record monitoring data over a specified time interval. Examples of monitoring frequencies include at least four points equally spaced for each hour for CEMS; and

4) Averaging Time: The period over which you average and use data to verify proper operation of the pollution control approach or compliance with the emissions limitation or standard.

Pursuant to Section 63.8(f)(4)(ii), the application must also contain a performance evaluation test plan (PETP) if requested. The detailed information contained in this petition meets the requirements of 40 CFR 63.8(e)(3)(i) which specifies the information that must be contained in a CMS PETP. Therefore, the PETP requirements for the particulate matter CEMS, the multi-metal CEMS, and the HCl CEMS are met through submission of the detailed alternative monitoring petition.

In addition, Section 3.4 of this alternative monitoring petition includes information justifying the request for an alternative monitoring method, such as the technical or economic unfeasibility, or the impracticality, of the affected source using the required method. This meets the requirements of Section 63.8(f)(4)(ii).

3.1 PARTICULATE MATTER CEMS

3.1.1 Indicator of Performance

The particulate matter CEMS is designed to continuously monitor the stack gas particulate matter concentration. Compliance with the particulate HWC MACT emission standard is demonstrated when the particulate matter measured stack concentration is less than or equal to the applicable standard. Currently, Lilly must comply with the interim PM standard of 34 mg/dscm, corrected to 7 percent oxygen, specified under Section 63.1203(b) of the HWC MACT. Lilly will comply with the HWC MACT final PM standard specified in Section 63.1219(a) no later than the date required by Section 1206(a)(1)(ii) of the HWC MACT Final Replacement Standards. The averaging time for both the interim and final PM standard is a 6-hour rolling average, updated every hour.

3.1.2 Measurement Technique

3.1.2.1 Operating Principles

The total particulate mass continuous emission monitoring system is a Sigrist Dust Emission Measuring System CTNR (or equivalent), manufactured by Sigrist Process-Photometer, AG. The Sigrist system is intended to measure particle mass concentration from the incinerator stack. It will withdraw a representative sample of the exhaust from the stack and transport it, via the Sigrist ring pipe, for measurement by the photometer. The sample transport system maintains sample stream temperature at approximately 160 ^{o}C (320 ^{o}F). A portion of the sample stream is separated (reducing orifice) and measured by the photometer, then merged back into the main sample stream for transport back into the incinerator stack. A data acquisition system collects particle measurement data from the photometer through the Sigrist Controller. Figures 2 and 3 illustrate the major components of the Sigrist CEMS, which include:

1. Sample Extraction System
2. Photometer
3. System Controller
4. Data Acquisition System (DAS) and Historian

3.1.2.1.1 Sample Extraction System

The Sigrist sample system consists of a sample probe and ring pipe. The sample probe size was selected by the manufacturer to provide an inlet gas velocity that is approximately 1.0 - 1.5 times greater than the normal stack gas velocity when sampling at the preset (design) rate of approximately 1 acm/min. This super-isokinetic operating condition is used to minimize particulate measurement error that can be significant at sub-isokinetic conditions. The super-isokinetic condition is an alternative to continuous monitoring of the stack gas velocity and adjustment of the sampling rate in order to maintain isokinetic conditions.

Stack gases are transferred through a ring pipe where the gas is conditioned by heating to approximately 160 ^{o}C (320 ^{o}F) to vaporize any water and acid droplets that may be present in the gas stream. A slipstream of the sample gas is extracted for "continuous" analysis by the photometer, which is also heated to 160°C and kept at a consistent pressure. After analysis, the slip stream gas passes through a flow measurement venturi and returns to the bypass sample gas stream, which is forwarded by the blower, to the sample return probe in the stack.

3.1.2.1.2 Photometric Analysis

The PM analysis is performed by the photometer which measures the attenuation in forward light caused by the PM present in the sample gas. The photometer measures forward light scattered at 15° from an incandescent bulb emitting over the range of 360 to 2800 nanometers. Dual beam compensation is used in which the light path is split and the intensity of the reference path is adjusted by an attenuator to equal the intensity of the measurement path. The sample and reference scattered light are combined ahead of a photocell, which generates a photoelectric signal that is proportional to the concentration of PM in the sample stream. The instrument response time is approximately 5 seconds. The photoelectric signal is amplified to 4 to 20 milliampere (mA) and output to the data acquisition system (DAS) on one of four available channels according to the increasing levels of intensity associated with increasing PM concentration. An automatic switching device operates relays to block a signal being sent from the other three channels. The system can also operate in a single or locked range. The nominal PM concentrations associated with the four measurement levels are 0-5, 0-1, 0-0.2, and 0-0.05 PLA based on a polystyrene latex aerosol (PLA) used in factory calibration of the monitor. The monitor's output signal, however, is always a single current value in the 4 -20 mA range.

3.1.2.1.3 System Controller

The SIGAR 4000 controller, or equivalent, is the connecting link between the photometer, the sample transport system, and the DAS. It communicates with the photometer, and processes and displays the particle mass reading signal. The SIGAR controller operates the sample transport system valves, heaters, blowers, and temperature sensors. The controller outputs critical system information including the real-time mass reading, sample transport system temperatures, and controller parameters. It stores all the threshold parameters for the Sigrist photometer. It provides relay contact input and outputs to signal photometer and sample transport system status. It provides the user interface for photometer and controller parameter setup and preservation.

3.1.2.1.4 Data Acquisition System and Historian

The Sigrist micro controller provides system operation, status, instrument output, and range identification to a computerized DAS. The DAS performs all data calculations for compliance. All data, system operation, status, and quality assurance data are stored in a historian.

3.1.2.2 Installation Location

The Sigrist PM CEMS will be located at a point in the stack that allows a representative sample to be extracted for subsequent analysis. This location will be at least two duct diameters from the top of the stack, and at least two duct diameters downstream from the last point of interference. The final PM CEMS location will be determined during the correlation test.

3.1.2.3 Installation

The PM CEMS will be installed per manufacturer's recommendations. The CEMS will be installed in a location such that the correlation between the PM CEMS response and emissions determined by a reference method will meet the performance specifications stated in this document. Once the system is installed, it will be commissioned for use. This exercise will verify the system is installed properly per the manufacturer's specification.

3.1.2.4 Instrument Span

The operating range of the PM CEMS will be established during the CEMS initial startup and correlation test plan period. Lilly will verify that the operating range (zero to span) will encompass the response of the PM CEMS for all expected waste streams.

3.1.2.5 System Start Up (Initial Operation)

The Sigrist will be started and allowed to run using ambient air in the sample line. A valve, located at the probe, allows Lilly to start the system with ambient air as opposed to flue gas. The system will run on ambient air for approximately four weeks. During this time, Lilly will check the operation of the system and correct any issues that arise.

After this approximate four-week period, Lilly will sample the flue gas under different feed conditions (surrogate material, liquid waste, solid waste, natural gas, fuel oil). Lilly will sample flue gas for approximately 4-8 weeks. The objective is to correct any issues that arise, and begin to compare the type of waste burned to the output of the Sigrist. Linearity checks will begin during this phase of the PM CEMS operation.

The linearity check is a procedure which checks the instrument drift at five levels. With an instrument response range of 4 to 20 milliamps, the linearity test checks the instrument drift at approximately 4, 5, 8, 12, and 16 milliamps. The percent drift will be calculated as:

$$\text{Percent Drift} = \frac{|R_{CEMS} - R_{REF}|}{Span} * 100$$

where:

Percent Drift = Amount of drift (%)

R_{CEMS} = The measured PM CEMS response (mA)

R_{REF} =The PM reference standard value (mA)

Span =Span of the instrument (20 mA)

3.1.2.5.1 Preliminary Correlation Test Plan Period

The intent of the preliminary correlation test plan period (PCTPP) during the PM CEMS startup is to: (1) understand the affect of specific materials (surrogate material and/or hazardous waste) on the response of the Sigrist PM CEMS (2) establish a preliminary correlation to predict particulate mass in terms of mg/scm, based on the output of the PM CEMS. It is expected that the PCTPP will take up to 16 weeks. Activities during the PCTPP will follow guidance in 40 CFR 60 Appendix B, Performance Specification 11 (PS11). The following activities will be conducted during the PCTPP:

Seven-Day Drift: Prior to beginning the PCTPP, the PM CEMS will have passed a seven-day drift test. For seven consecutive days, the linearity check will be completed. The percent drift at five levels will be recorded. Each value must be within 5% of the reference value.

Reference Method: During the PCTPP, Lilly will use Method 5 or Method 5i as the reference method. Lilly will use dual trains (perpendicular trains) for the reference method (RM) sampling. The targets are 60-minute runs. Shorter or longer runs may be necessary. For example, for high particulate loading, the test runs may only be 45 minutes due to excessive pressure drop across the filter, and for very low particulate loading, test runs may be 120 minutes. The averaging time for each run will be documented. Lilly will treat each sample train result in the data set as an individual data point.

Data range: During the PCTPP, Lilly will collect at least 15 valid data sets consisting of simultaneous PM CEMS and dual RM measurements. More may be collected so that certain test results may be rejected.

Lilly will attempt to collect data in three ranges [(Low) from zero to 50% of maximum measured PM concentration; (Mid) 25 – 75% of the maximum measured PM concentration; and (high) 50 to 100 % of the maximum measured PM concentration]. The goal is to have at least 20% of the total data in each of the three ranges. A data set can only be used for one range. Lilly will use zero point data for the low values if a response at the low level cannot be achieved.

Reference Method Data: During the PCTPP, Lilly will evaluate the precision of the two sample trains by determining the relative standard deviation (RSD) for each paired data set and comparing it to the recommended maximum RSD. The RSD will be calculated for each test run using the following equation:

$$RSD = 100 * \frac{|(C_a - C_b)|}{(C_a + C_b)}$$

where:

RSD = relative standard deviation (%)

Ca = concentration measured using Train A, units of concentration

Cb = concentration measured using Train B, same units as Ca.

Pursuant to Section Z.1.4 of EPA's Draft Guidance Document on PM CEMS, the recommended maximum RSD will be determined as follows:

- For average PM concentrations that are at least 10 mg/dscm (or at least 10 mg/acm), the recommended maximum RSD is 10%
- For average PM concentrations that are less than or equal to 1.0 mg/dscm (or less than or equal to 1.0 mg/acm), the recommended maximum RSD is 25%; and
- For average PM concentrations between 1.0 and 10 mg/dscm (or between 1.0 and 10 mg/acm), the recommended maximum RSD is determined using the following equation:

$$RSD_r = (26.67 - 1.67C_{ave})$$

where:

RSD_r = recommended maximum RSD for average PM concentration between 1.0 and 10 mg/dscm, (%).

C_{ave} = average PM concentration for the Trains A and B, units of concentration

EPA's draft guidance document on PM CEMS is provided in Appendix A.

If the RSD analysis shows that the data for all test runs are within the recommended maximum RSD, no further assessment of data precision will be performed. If the RSD shows one or more outliers, Lilly will use the standardized residual method. Under the standardized residual method, Lilly will plot data that compares Train 1 sampling results to Train 2 sampling results. The linear relationship must have a slope falling between 0.93 and 1.07. Data sets will be removed until the reference method data meets this criterion.

Preliminary Correlation Development: Valid reference method data (Train 1 and Train 2 as individual points) will be plotted against the Sigrist output (mA or PLA) averaged over the sample period. The average Sigrist output will be on the X-axis and RM result, in mg/scm (to represent the conditions in sample train standardized to standard temperature and pressure) on the Y-axis. Using the equations in PS11, Lilly will calculate up to five correlations (1) linear (2) polynomial (3) logarithmic (4) exponential (5) power correlation models. Each attempted correlation will have the correlation coefficient, tolerance interval, and confidence interval calculated as described in PS11. Lilly will compare the correlation coefficient, confidence interval, and tolerance interval to the limits in PS 11. A successful preliminary correlation will be obtained, that uses real-time CEMS values to predict PM concentrations in mg/scm, if all statistical checks in PS11 are met.

During the correlation development, drift from the linearity checks will be recorded daily. If the drift, for any of the values, exceeds 8%, the PM CEMS will be adjusted and a new drift test performed.

3.1.2.6 PM CEMS Calibration Correlation Test (PM CEMS Certification)

The objective of the calibration correlation test period (CCTP) is to collect data, while burning hazardous waste, to establish a correlation which will predict total particulate mass emissions, in mg/scm, based upon the output of the Sigrist PM CEMS. PS 11 will be used as guidance to establish a valid calibration correlation.

The following activities will be conducted during the CCTP:

Seven day Drift: Prior to beginning the CCTP, the PM CEMS will have passed a seven day drift test pursuant to Section 8.5(3) of PS 11. For seven consecutive days, the linearity check will be completed. The percent drift at five levels will be recored. Each value must be within 5% of the reference value.

Absolute Correlation Audit: The absolute correlation audit (ACA) evaluates the PM CEMS response to a series of reference standards covering a full measurement range of the instrument. To conduct this audit the PM CEMS will be challenged three times at each of the five audit points. Lilly will follow Section 10.3(2) of 40 CFR 60 Appendix F Procedure 2 (Procedure 2) as guidance for conducting the ACA. The average response will be used to calculate the accuracy at each audit point. The ACA will be calculated using the equation in Procedure 2 listed below. The error cannot exceed 10% of the audit value, or 7.5% of the applicable standard; whichever is greater.

$$\text{ACA Accuracy} = \frac{|R_{CEMS} - R_{REF}|}{R_{REF}} * 100$$

where:

ACA Accuracy = The ACA accuracy at each audit point, (%)

R_{CEMS} =the measured PM CEMS response to the reference standard (mA)

R_{REF} =the PM reference standard value (mA)

Stratification Test: Lilly will test for PM stratification by following the same general steps specified for gaseous pollutants, and following the guidance specified in Section V.5 of EPA's Draft Guidance Document on PM CEMS. To determine whether effluent stratification exists, a dual probe system will be used to determine the average effluent concentration while measurements at each traverse point are being made. One probe, located at the stack centroid, will be used as a stationary reference point to indicate change in the effluent concentration over time. The second probe will be used for sampling at the traverse points specified in Method 1 (40 CFR part 60 appendix A). The monitoring system samples simultaneously at the reference and traverse points throughout the testing period for approximately fifteen minutes at each point. A minimum of 12 sampling points will be used, with 6 sampling points along each of the two traverses. Lilly will use Method 5 as the sampling method and sample at least 15 minutes at each sampling point.

The PM concentrations at each traverse point are then compared to the average of the PM concentrations for all sampling points to determine the percent stratification using the following equation:

$$S = \left| C_i - C_{ave} \right| * 100\%$$

where:

S = percent stratification

C_i = PM concentration at sampling point

C_{ave} = average PM concentration for all sampling points.

If the percent stratification is less than or equal to 10 percent for any traverse point, the duct is not considered stratified at that location.

Reference Method: Lilly will use Method 5 or Method 5i as the reference method. Lilly will use dual trains (perpendicular trains) for the reference method (RM) sampling. The targets are 60-minute runs. Shorter or longer runs may be necessary. For example, for high particulate loading, the test runs may only be 45 minutes due to excessive pressure drop across the filter, and for very low particulate loading, test runs may be 120 minutes. The averaging time for each run will be well documented. Lilly will adhere to PS11 and treat each sample train result in the data set as an individual data point.

Data range: Lilly will adhere to PS11 for the data collection. This requires at least 15 valid data sets consisting of simultaneous PM CEMS and dual RM measurements. More may be collected so that certain test results may be rejected as long as at least 15 valid data sets are used to determine the correlation. All data will be reported.

Lilly will attempt to collect data in three ranges [(Low) from zero to 50% of max PM concentration; (Mid) 25 – 75% of the max PM concentration; and (high) 50 to 100 % of the max PM concentration]. The goal is to have at least 20% of the total data in each of the three ranges. A data set can only be used for one range. Lilly will use zero point data for the low values if a response at the low level cannot be achieved.

While collecting total particulate mass data during the CCTP, the intention is to collect total particulate data that is close to, but not significantly greater than the total particulate mass emission standard. However, because the purpose of CCTP is to develop an acceptable correlation that can verify compliance at the emission standard, it is impossible to ensure that the total particulate mass emission standard will not be exceeded during some of the test runs. Accordingly, emissions standards from parts 60, 61, 63, 264, 265, and 266 of Title 40 of the Code of Federal Regulations do not apply while conducting a correlation testing program. Any permit or other emissions or operating parameter limits or conditions, including any limitations on work place practices, that are applicable to ensure compliance with the emissions standards of parts 60, 61, 63, 264, 265, and 266 of Title 40 of the Code of Federal Regulations also do not apply while conducting a correlation testing program.

Reference Method Data: Lilly will evaluate the precision of the two sample trains by determining the relative standard deviation (RSD) for each paired data set and comparing it to the recommended maximum RSD. Lilly will follow the guidance provided in Section Z.1.4 of EPA's Draft Guidance Document on PM CEMS. The RSD will be calculated for each test run using the following equation:

$$RSD = 100 * \frac{\left|(C_a - C_b)\right|}{(C_a + C_b)}$$

where:

RSD = relative standard deviation (%)

Ca = concentration measured using Train A, units of concentration

Cb = concentration measured using Train B, same units as Ca

Pursuant to Section Z.1.4 of EPA's Draft Guidance Document on PM CEMS, the recommended maximum RSD will be determined as follows:

- For average PM concentrations that are at least 10 mg/dscm (or at least 10 mg/acm), the recommended maximum RSD is 10%
- For average PM concentrations that are less than or equal to 1.0 mg/dscm (or less than or equal to 1.0 mg/acm), the recommended maximum RSD is 25%; and
- For average PM concentrations between 1.0 and 10 mg/dscm (or between 1.0 and 10 mg/acm), the recommended maximum RSD is determined using the following equation:

$$RSD_r = (26.67 - 1.67C_{ave})$$

where:

RSD_r = recommended maximum RSD for average PM concentration between 1.0 and 10 mg/dscm, (%).

C_{ave} = average PM concentration for the Trains A and B, units of concentration

If the RSD analysis shows that the data for all test runs are within the recommended maximum RSD, no further assessment of data precision will be performed. If the RSD shows one or more outliers, Lilly will use the standardized residual method. Under the standardized residual method, Lilly will plot data that compares Train 1 sampling results to Train 2 sampling results. The linear relationship must have a slope falling between 0.93 and 1.07. Data sets will be removed until the reference method data meets this criterion. All data will be saved and submitted. Regardless of which method is used, any potential outliers will be investigated to determine possible causes for the lack of precision.

Correlation Development: Valid reference method data (Train 1 and Train 2 as individual points) will be plotted against the Sigrist output (mA or PLA) averaged over the sample period. The average Sigrist output will be on the X-axis and RM result, in mg/scm (to represent the conditions in sample train standardized to standard temperature and pressure) on the Y-axis. Using the equations in PS11, Lilly will calculate up to five correlations (1) linear (2) polynomial (3) logarithmic (4) exponential (5) power correlation models. Each attempted correlation will have the correlation coefficient, tolerance interval, and confidence interval calculated as described in PS11. Lilly will compare the correlation coefficient, confidence interval, and tolerance interval to the limits in PS 11. A successful correlation will be established that uses real-time CEMS values to predict particulate concentration in mg/scm if all statistical checks in PS11 are met. If the PM CEMS does not pass the statistical limits for any of the five correlations, Lilly, with appropriate agency review, may develop an alternative correlation by providing an explanation of how compliance demonstration would be assured.

The correlation established during the CCTP for the PM CEMS will supersede any previous correlations, which may have been established.

During the CCTP, drift from the linearity checks will be recorded daily. If the drift, for any of the values, exceeds 8% once, the PM CEMS will be adjusted and a new drift test performed.

3.1.2.7 Routine Operation of the PM CEMS

3.1.2.7.1 On-Going Quality Assurance

This section describes the on-going quality assurance that will be performed on the PM CEMS to ensure that it continues to operate correctly and produces valid data. These quality assurance activities will occur only when the PM CEMS is operational. Lilly will follow Procedure 2 and EPA's Draft Guidance Document on PM CEMS located in Appendix A of this document when performing on-going quality assurance on the PM CEMS.

3.1.2.7.2 Routine System Checks

Daily checks of the PM CEMS will be done according the recommended checklist provided by Sigrist, as modified by Lilly. Data status flags will be used to troubleshoot any problems that arise in the PM CEMS system. This meets the intent of the daily system checks in PS11.

3.1.2.7.3 Weekly Linearity Drift Checks

Lilly will perform a linearity check once per week. This will be performed manually according to the procedure outlined in the Sigrist operational manual.

The percent drift is calculated as:

$$\% \text{ Drift} = \frac{|R_{CEMS} - R_{REF}|}{Span} * 100$$

where:

% Drift = Drift of the CEMS (%)

R_{CEMS} = the measured PM CEMS response (mA)

R_{REF} =the PM reference standard value (mA)

Span =Span of the instrument (20 mA)

Five values between 0-20 mA will be checked. The actual value(s) will be adjusted when the drift exceeds 5% for any of the five values. (Refer to Section 3.1.2.9 for out of control definition).

The Sigrist will be off-line for up to one hour during the linearity check. All calibration data collected along with the drift percentage will be recorded. During this time, the 6-hour rolling block average will be frozen.

3.1.2.7.4 System Audits

3.1.2.7.4.1 Quarterly Absolute Correlation Audit (ACA)

The absolute correlation audit (ACA) evaluates the PM CEMS response to a series of reference standards covering a full measurement range of the instrument. To conduct this audit, Lilly will perform the linearity drift check. The PM CEMS will be challenged three times at each of the five audit points. The average response will be used to calculate the accuracy at each audit point. The ACA will be calculated using the Equation 2-1 in Procedure 2 as follows:

$$\text{ACA Accuracy} = \frac{\left|R_{CEMS} - R_{REF}\right|}{R_{REF}} * 100$$

where:

ACA Accuracy = Accuracy of the CEMS (%)

R_{CEMS} = the measured PM CEMS response (mA)

R_{REF} =the PM reference standard value (mA)

The error cannot exceed 10% of the audit value, or 7.5% of the applicable standard; whichever is greater. The ACA will be performed each quarter.

3.1.2.7.4.2 Quarterly Relative Response Audit (RRA)

The relative response audit (RRA) is a brief series of tests conducted between annual full response correlation audits (RCA) to assure the continued validity of the PM CEMS correlation. The RRA will be performed by collecting, at current source conditions, three reference method samples and PM CEMS measurements at the as-found source operating conditions. The data points will be plotted on the current calibration correlation function. To meet the RRA performance criteria, the three points must be less than or equal to the highest CEMS values used for the calibration curve and two of the three sets of PM CEMS and RM measurements must fall within a specified area on the graph of the calibration correlation function. The specified area is two lines parallel with the correlation regression curve, offset at a distance of ± 25% of the numerical emission limit value from the correlation regression curve.

If the PM CEMS does not meet the RRA criteria, Lilly will take the necessary corrective action to eliminate the problem and repeat the test. If the RRA criteria cannot be achieved, Lilly will perform an RCA.

3.1.2.7.4.3 Annual Response Correlation Audit (RCA)

Lilly will perform a response correlation audit (RCA) annually. The quarterly RRA will not be performed in the same quarter that the annual RCA is preformed. The response correlation audit (RCA) is a series of tests conducted to assure the continued validity of the PM CEMS correlation. Lilly will conduct the RCA as prescribed in PS11 and Procedure 2. Lilly will collect a minimum of 12 data points attempting to disperse the points through low, mid, and high ranges on the calibration correlation function. The points will be plotted on the current calibration correlation function. To meet the RCA criteria, 75% of the points must fall within a specified area on the correlation regression curve. The specified area is two lines parallel with the calibration correlation function, offset at a distance of ± 25% of the numerical emission limit value from the correlation regression curve.

As defined in Section 10.6 of Procedure 2, if Lilly does not meet the performance criteria, then the two data sets (current correlation and the current RCA) will be combined and the correlation statistics in PS11 applied. If a correlation from the combined data sets passes the statistical limits, this correlation becomes the new correlation curve. If the statistical limits are not met with the combined data, Lilly will use only the RCA data and run the PS11 statistics. If the statistical limits are met, this is the new correlation curve. If the statistical limits are not met for the RCA data, the correlation test will be redone with a minimum of 15 data points, applying the statistics in PS11. If the new data do not meet the statistical criteria for any of the five PS11 equations, and assuming no definable problems exist with the PM CEMS, Lilly, with appropriate agency review, may develop an alternative correlation by providing an explanation of how compliance demonstration would be assured.

While collecting total particulate mass data during the RCA, the intention is to collect total particulate data that is close to, but not significantly greater than the total particulate mass emission standard. However, because the purpose of RCA is to verify that the correlation is suitable for complying with the emission standard, it is impossible to ensure that the total particulate mass emission standard will not be exceeded during some of the test runs. Accordingly, emissions standards from parts 60, 61, 63, 264, 265, and 266 of Title 40 of the Code of Federal Regulations do not apply while conducting a correlation testing program. Any permit or other emissions or operating parameter limits or conditions, including any limitations on work place practices, that are applicable to ensure compliance with the emissions standards of parts 60, 61, 63, 264, 265, and 266 of Title 40 of the Code of Federal Regulations also do not apply while conducting a correlation testing program.

3.1.2.8 Component Replacement

During normal operation of the PM CEMS, specific components will need to be replaced. The PM CEMS standard operating procedures will address the criteria to be met upon replacement of significant components.

3.1.2.9 Out of Control

Lilly will adjust the PM CEMS when the drift is equal to or greater than 5%. Lilly will consider the PM CEMS out of control if drift, for any of the five values, exceeds 8%. In addition, the CEMS will be deemed out of control if the PM CEMS fails to meet the RCA criteria, RRA criteria, or ACA criteria.

The out of control period will begin immediately after the last test run or check of an unsuccessful RCA, RRA, ACA, or linearity drift check. The out of control period ends immediately after the last test run or check of the subsequent successful audit or drift check, when the metals CEMS is used as a back-up, or when the incinerator enters parametric mode. When the incinerator is operating in parametric mode, the PM CEMS will not be deemed out of control.

3.1.3 Use of the PM CEMS for Compliance with the HWC MACT PM Standard

Lilly may begin using the PM CEMS to demonstrate continuous compliance with the HWC MACT PM emission standard only after the following is achieved:

- A successful PM CEMS Calibration Correlation Test as specified in Section 3.1.2.6 following EPA's approval of this Alternative Monitoring Petition.
- A modification to the Title V permit is approved that incorporates the requirements of the approved Alternative Monitoring Petition.

Following completion of the above, on-going quality assurance will be performed on the PM CEMS as specified in Section 3.1.2.7 of this document.

3.1.4 Monitoring Frequency and Averaging Time

The PM CEMS will provide a six-hour rolling block average in mg/dscm corrected to 7% oxygen. The six-hour block average was selected as representative of the time period to collect three manual particulate measurement samples. One-minute values will be used to develop 15-minute average values, which will be used to develop one-hour block average values and six-hour rolling block average values.

Using the equation from the calibration correlation, the PM CEMS output values will be converted to mg/scm each minute. The Ecochem CEMS will send the DAS one-minute average oxygen and moisture values to use to correct the PM CEMS values to mg/dscm at 7% oxygen.

The particulate stack concentration will be corrected to 7% oxygen by the following equation:

$$PM_{corr} = PM_{uncorr} * \frac{21-7}{21-O_2}$$

where:

PM_{corr} = PM concentration corrected to 7% oxygen (mg/dscm)
PM_{uncorr} = PM stack gas concentration (mg/dscm)
O_2 = Oxygen stack gas percent (vol % dry)

The 15-minute data is the average of the one-minute data within that block of time. Only one valid one-minute value is required to achieve a valid 15-minute average value.

The hourly block average will be calculated from the four 15 minute averaged values during the hour as shown in the following equation:

$$HBA = \frac{\sum_{i=1}^{4} Ci}{4}$$

where:

HBA = Hourly block average value (mg/dscm corrected to 7% O_2)

Ci = a fifteen minute observation from the CEMS analyzer (mg/dscm corrected to 7% O_2.)

In the event that four valid 15-minute averaged values are not available to calculate an hourly block average (i.e. the CEMS produced problematic data), valid results must be available for at least three 15-minute cycles of operation to calculate a one-hour block average.

The six-hour rolling average will be calculated based on the average of the six most recent hourly block averages as shown in the following equation:

$$SHRA = \frac{\sum_{i=1}^{6} HBA}{6}$$

where:

SHRA = Six hour rolling average value (mg/dscm corrected to 7% O_2)

HBA = Hourly block average value (mg/dscm corrected to 7% O_2)

The six-hour rolling block average will be updated every hour when a new, valid, hourly block average is calculated.

3.1.5 Rolling Block Average Calculations during Routine Checks and System Audits

Lilly will put the PM CEMS in a non-measure mode once per week for up to one hour in order to perform the weekly linearity checks while burning hazardous waste. During this time, block average calculations will be frozen. Rolling block hour average calculations will resume once the linearity check is successfully performed. The six-hour rolling block average calculations will resume by adding the first valid hour block average after the linearity check to the previous five hour block average values.

The rolling average calculations will also be frozen during the quarterly absolute correlation audits. Block hour average calculations will resume once the audit is complete. The ACA auditing may take more than one hour to complete.

The PM CEMS DAS uses the oxygen concentration and moisture content from the Ecochem CEMS to correct the one minute average mg/scm concentrations of PM to 7% oxygen, dry basis. Once per day, the Ecochem will be in calibration mode for up to one hour. During this time the PM block average will also be frozen. Incinerator operations will attempt to maintain stable operating parameters during times of calibration.

3.1.6 Backup to the Particulate Matter CEMS

In the event the PM CEMS is not operating, Lilly will have the option to use the multi-metals CEMS as a backup to the PM CEMS under the following conditions:

1. Results obtained from parallel operation of the two CEMS will be used to develop a technical justification of how the metals CEMS provides reasonable assurance of compliance with the PM emission standard.

2. When the PM CEMS is not operating and the multi-metals CEMS begins use as a backup, Lilly will use its best efforts to avoid introducing new waste streams (i.e. those that have not been historically burned while the two CEMS were in parallel operation) from the six “in-feed” conveyors to the final “merge” conveyor that leads to the kiln feed chute.

In order to allow CEMS mode to establish waste streams that are not “new” during its initial implementation period, the above restrictions on use of the multi-metals CEMS serving as a backup for the PM CEMS will apply only after a sufficient time period has elapsed (not to exceed 6 months from the first CEMS mode operation) for Lilly to gain experience while processing a variety of existing solid waste streams. Finally, Lilly will attempt to maintain nominally stable or historically lower feed rates of waste while the backup is being used, and will limit the use of the multi-metals CEMS as a back up for the PM CEMS to 14 consecutive days per episode.

Lilly will use its best efforts to minimize the time that the multi-metals CEMS acts as a backup to the PM CEMS. To facilitate its efforts, Lilly will keep spare parts in stock and will maintain a service relationship with the PM CEMS manufacturer, or other qualified consultants, to minimize downtime. If both the PM CEMS and the multi-metals CEMS are not in use, Lilly will monitor operating parameter limits defined in

Section 1209 of the HWC MACT (i.e. parametric operation). Details of the specific operating limits are provided in the Notification of Compliance (NOC).

Lilly will incorporate delays when transitioning from the CEMS mode of operation to the parametric mode of operation. Specifically, once the primary PM CEMS and the backup multi-metals CEMS are unavailable, the control system will automatically switch to the parametric mode of operation. Rolling averages, related to the Air Pollution Control System (APCS), will not start until the system has been under the parametric mode of operation for 10 minutes. This 10-minute time period will allow Lilly time to make any adjustments to the APCS to bring the system to within the respective operating parameter limits. In addition, up to four hours will be allowed before re-starting constituent feed rate rolling average operating parameter limits in order to clear the solid feed conveyor system. (Note that, in a similar fashion to the "backup" scenario described above, Lilly will use its best efforts to avoid introducing "new" waste streams from the six "in-feed" conveyors to the final "merge" conveyor that leads to the kiln feed chute during this four hour period. However, during initial CEMS mode operation periods there will be practical limitations to this criterion because few waste streams will have been burned.) Feed rates will be maintained nominally stable or historically lower than when operating in CEMS mode. If the CEMS mode of operation is still not available after four hours, the transition to parametric mode will be completed and only waste with known composition will be processed in the incinerator so that constituent feed rate operating parameter limits can be computed.

3.1.7 Deviations from Performance Specification 11

- *The Sigrist PM CEMS samples superisokinetic and may not continuously meet the requirement of plus or minus 10% isokinetic.* The Sigrist system is designed to sample superisokinetic. This is normally about 1.2 to 1.5 times isokinetic. Because of the Sigrist design, Lilly cannot be sure that the system will always be within ±10% of isokinetics. Lilly will adhere to PS11 and provide data indicating that isokinetic sampling is not necessary. This data will consist of particulate size distribution data showing the PM is predominately small particles; thus acting as a gas. The particulate size distribution data will be collected during the Comprehensive Performance Test.

- *The calibration correlation function will plot Sigrist values (mA or PLA) on the X-axis and the reference method average in units of mg/scm on the Y-axis.* PS11 indicates that the reference method values for PM should be in the same units as the CEMS (the Sigrist units are mg/Sigrist m^3). Based upon the experience with the Sigrist at Lilly (PM CEMS demonstrations 1 and 2), Lilly saw no affect upon the correlation by correcting the Method 5 units to units of the Sigrist. The operating pressure inside the photometer is not well defined, making correction to this pressure an unknown. Based upon experience, Lilly will standardize the RM data to mg/scm

(68°F and 29.92 inches). This is also consistent with the way Lilly's Kinsale, Ireland facility has established valid correlations to the two Sigrist units operated at that facility.

- *Lilly will use up to 20% of the correlation data (low range only) for zero points if low PM data cannot be produced.* It is important to provide PM emission data for the correlation that is spread across the desired range of measurement. Often, data at the low end of the range is difficult to obtain. Given this fact, using zero points for the low data may be required.

- *Lilly will conduct a seven-day drift prior to the calibration correlation.* This will be the linearity check procedure described in the Sigrist operation manual (checks 5 values between 0-20 mA), which is a manual exercise each day for seven days. The criteria will default to the allowable drift recommended by Sigrist of 5% as opposed to 2% of the span indicated in PS11. Use of the Sigrist for compliance to a PM standard is new in the US. In our experience, the criteria specified above are sufficient to understand the drift of the unit and is acceptable based on our PM CEMS demonstrations. Sigrist (the CEMS manufacturer) supports using the above criteria.

- *PS11 stipulates immediate compliance with QA/QC requirements (Procedure 2) upon successfully completing the correlation test outlined in PS11.* Lilly will comply with Proposed Procedure 2 after final correlation and statistics have been established and the Sigrist PM CEMS is deemed ready for use as a compliance tool. Until then, Lilly will use another means (surrogate operating parameters or the multi-metals CEMS) to assure compliance with the PM standard if waste is being burned in the solid-liquid incinerator.

- *Appendix F, Procedure 2 does not discuss time to calibrate for the Sigrist.* Lilly will put the Sigrist in a non-measure mode once per week for up to one hour while continuing to burn hazardous waste in order to perform the calibration checks.

- *Linearity drift will be checked once per week, not once per day.* Lilly will follow PS11 on adjusting the zero or upscale value when the drift, per the Procedure 2 equation, is greater than 5%. Sigrist recommends checking the zero and or upscale drift not more than once per week. Since the photometer compensates for electronic drift during each sample, checking the zero and upscale drift daily is of no value. NOTE: The weekly calibration drift check will check five values within the 0 – 100% range of the PM CEMS. This exceeds the zero and upscale drift range requirements.

- *PS11 deems the CEMS out of control if the daily, zero or upscale drift exceeds 4% for five consecutive days, or 8% once.* Lilly will adhere to the 8% requirement as described in section 3.1.2.9.

- *While performing the quarterly ACA the PM CEMS may be off-line for greater than one hour per day.* The time off-line will not require use of either the multi-metals CEMS or surrogate parameters to demonstrate compliance with the HWC MACT. The quarterly audits will not require the use of parametric mode.

3.2 MULTI-METALS CEMS

3.2.1 Indicator of Performance

Lilly has voluntarily chosen to use a multi-metals CEMS to demonstrate continuous compliance with the HWC MACT metals emission limits. Using a CEMS to monitor stack gas concentrations of metals is a relatively new application and as such, the HWC MACT does not require facilities to install and operate a multi-metals CEMS for HWC MACT compliance purposes.

The multi-metals CEMS is designed to continuously monitor the stack gas concentration of mercury, arsenic, chromium, cadmium, and lead to demonstrate compliance with the HWC MACT metals emission limits. Compliance with HWC MACT metals emission standards will be demonstrated when the measured stack metals concentrations are less than or equal to the applicable standards. Currently, Lilly must comply with the HWC MACT interim standards under 40 CFR 63.1203(b). Compliance with the interim HWC MACT mercury standard will be demonstrated when the measured stack concentrations of mercury is less than or equal to 45 ug/dscm corrected to 7% oxygen over a 12-hour rolling averaging period, updated hourly. Compliance with the low volatile metals HWC MACT interim emission standard will be demonstrated when the measured stack concentrations of arsenic and chromium and default levels of beryllium (see section 3.2.2.1) are less than or equal to 97 ug/dscm combined, corrected to 7% oxygen over a 12-hour rolling averaging period, updated hourly. Compliance with the semi-volatile metals interim HWC MACT emission standard will be demonstrated when the measured stack concentrations of lead and cadmium are less than or equal to 120 ug/dscm combined, corrected to 7% oxygen over a 12-hour rolling averaging period, updated hourly.

Lilly will comply with the HWC MACT final replacement metals emission standards specified in Section 63.1219(a) no later than the date required by Section 1206(a)(1)(ii) of the HWC MACT Final Replacement Standards.

3.2.2 Measurement Technique

3.2.2.1 Operating Principles

The multi-metals CEMS is an X-ray based continuous emission monitor (XACT) manufactured by Cooper Environmental Services LLC (or equivalent). The XACT extracts a representative stack gas sample and concentrates the particulate and gas phase metals on a chemically-reactive filter. The concentrations of metals in the filter deposits are measured with an energy-dispersive X-ray fluorescence (XRF) analyzer. Figures 3 and 4 schematically illustrate the major components of the XACT, which include:

1. A sample extraction system
2. A sample collection module
3. A metals analysis module
4. A flow control module
5. A system control module
6. A PC interface
7. A Data Acquisition System and Historian

The XACT is designed to measure the concentration of up to 20 elements, including antimony (Sb), arsenic (As), barium (Ba), cadmium (Cd), chromium (Cr), cobalt (Co), lead (Pb), manganese (Mn), mercury (Hg), nickel (Ni), selenium (Se) silver (Ag), and thallium (Tl).

Because the XACT is incapable of measuring beryllium (Be), Lilly has developed a default value for beryllium emissions. Fortunately, beryllium is a scarce element that is not used in Lilly pharmaceutical manufacturing processes. Lilly has examined all its manufacturing processes and associated process construction materials (e.g. alloy steels) and found no indication that beryllium should be present. Therefore, Lilly believes that a conservatively calculated default value for beryllium is technically defensible.

Trace levels of beryllium are possible in raw materials and ground water. Lilly has sampled its liquid waste and found only sporadic “hits” of beryllium at levels close to the detection limits. Lilly has also done some limited sampling of plant trash, some of which might be processed in the solid-liquid incinerator, and some low-levels of beryllium were reported. For the purposes of calculating a conservative default emission concentration, Lilly has assumed that all liquid and solid wastes fed to the solid-liquid incinerator contain Be at the maximum levels detected: 1.0 ppm in the solid waste and 0.01ppm in the liquid wastes. The default emission concentration was then calculated using the maximum waste feed rates from the CPT plan, and an LVM system removal efficiency (SRE) of 98% (which is a factor of two less than the design SRE of 99% and a factor of 20 less than the SRE of 99.9% obtained during the CPT of another Lilly incinerator with a virtually identical scrubber system). The resulting value was just over 1 ug/dscm. To be more conservative, Lilly has chosen 2 ug/dscm as a default value. Therefore, a value of 2 ug/dscm will be added to the measured LVM emission before comparison to the emission standard limit. If the CPT data or any other evidence indicates the default value is not appropriate, it will be adjusted accordingly.

Copies of the XACT Multi-Metals CEMS Guidance Documents, Performance Specifications, and Quality Assurance Documents are provided in Appendix B.

3.2.2.1.1 Sample Extraction System

The extraction system for the XACT is identical to the extraction system used by the Sigrist PM CEMS. The sample system consists of a sample probe and ring pipe. The sample probe size was selected by the manufacturer to provide an inlet gas velocity that is approximately 1.0 to 1.5 times greater than the normal stack gas velocity when sampling at the preset (design) rate of approximately 1 acm/min. This super-isokinetic operating condition is used to minimize particulate measurement error that can be significant at sub-isokinetic conditions. The super-isokinetic condition is an alternative to continuous monitoring of the stack gas velocity and adjustment of the sampling rate in order to maintain isokinetic conditions.

Stack gases are withdrawn through a fixed sample probe, transferred through a ring pipe where the gas is conditioned by heating to approximately 160 ^{o}C (320 ^{o}F) to vaporize any water and acid droplets that may be present in the gas stream. A slipstream of the sample gas is extracted isokinetically from the main ring pipe flow into a large diameter stilling chamber and through the flow control module.

3.2.2.1.2 Sample Collection Module

About one liter per minute (lpm) of the stack gas is isokinetically drawn from the stilling chamber through a sampling tube, mixed with a reducing agent, and filtered through a filter tape for analysis. After sampling for approximately 15 minutes, the deposit spot is advanced about two inches where the metals concentrations per sample deposit are measured by XRF while the next sample is being collected.

3.2.2.1.3 Metals Analysis Module

The metals analysis module of the XACT consists of an energy dispersive multi-element XRF analyzer. This multi-element sensor consists of an X-ray tube and a lithium-drifted silicon energy dispersive X-ray detector, or equivalent. The energy of the characteristic X-rays provides the qualitative information to identify the elements present in the sample while the intensity of each analyte line (X-ray) provides the quantitative information to determine the mass of each element present in the deposit. The mass of each metal per sample deposit spot is reported to the data acquisition system for subsequent stack gas concentration calculations.

3.2.2.1.4 Flow Control Module

The filtered gas from the sample module is drawn through the gas conditioning component of the flow control module. These components remove moisture and corrosive gases from the stack gas allowing for volume measurements in dry standard cubic meters (dscm). The gas is then drawn through a two-way solenoid valve, pressure transducer, and mass flow controller. Typically, the flow travels directly to a manual leak check valve and vacuum pump but a flow QA loop is available for cross-checking flows against a second mass flow meter. After flowing through the vacuum pump, the sample gas is returned to the stack.

3.2.2.1.5 System Control Module

The system control module consists of programmable logic control devices, firmware, power supplies, relays, fuses, etc. to control the temperatures, flows and mechanical aspects of the system. The status of these components is monitored by software and firmware associated with the PC module.

3.2.2.1.6 PC Interface Module

The PC module contains the overall system control, XRF analysis, and calculation software. This software monitors the system operating parameters and presents a variety of status and flags when a component is operating outside of defined control ranges. It also performs quantitative XRF metals concentration calculations and combines the metals concentrations per sample deposit with the volume sampled per sample deposit data to calculate dry stack gas concentrations in micrograms per dscm.

3.2.2.1.7 Data Acquisition System and Historian

Metals concentrations, in micrograms per dscm, data status, quality assurance data, status flags, and system operational status/alarms are passed to a data acquisition system (DAS). The DAS performs the data calculations for compliance. All data are saved in a historian.

3.2.2.2 Installation Location

The XACT sample interface inlet will be installed at an accessible location downstream of the air pollution control equipment where the metals concentration of the XACT-extracted sample of stack aerosol will be representative of the metals concentration (ug/m^3) in the effluent emitted from the stack. Specifically, the monitor location will be at least:

- 2 equivalent duct diameters downstream from the nearest control device, point of pollution generation or other point at which a change in the pollutant concentration or emission rate may occur.

- 2 equivalent duct diameters upstream from the effluent exhaust.

The equivalent duct diameter is calculated as per 40 CFR Part 60, Appendix A, Method 1, Section 2.1.

A representative sample of stack gas will be drawn from the stack at an approximate rate of one cubic meter per minute, immediately heated to a temperature above the dew point for most acids, and maintained at that temperature during transport through heat-traced and insulated stainless steel tubing to an instrument shed housing the CEMS and other monitoring instruments.

3.2.2.3 Installation

The XACT CEMS will be installed per manufacturer's recommendations. Once the system is installed, it will be commissioned for use. This exercise will verify the system is installed properly per the manufacturer's specification.

3.2.2.4 Instrument Span

The operating range of the XACT CEMS will be established during the CEMS certification period. Lilly will verify that the operating range (zero to span) will encompass the response of the XACT CEMS for all expected waste streams. The HWC MACT emission limits, for the three metal classes, will fall within this measurement range.

3.2.2.5 System Start-up (Initial Operation)

The initial start-up of the XACT CEMS will be at Cooper Environmental Services. The XACT CEMS will be operated, sampling room air, to shakedown the system. Once the system is operating without errors, the XACT CEMS will undergo a Factory Acceptance Test to verify that the system meets or exceeds the functional criteria.

3.2.2.5.1 Factory Acceptance Test

The Factory Acceptance Test will be executed at Cooper Environmental Services. The objective of this testing is to ensure the XACT CEMS meets or exceeds the functional operating criteria. Results of the Factory Acceptance Test will be documented and include the following major components:

1. Manual Check List
2. National Institute of Standards and Technology (NIST) Traceable Thin Film Calibration
3. XRF Energy Alignment Check
4. Stability Check
5. Blank Bias Check (zero drift check)
6. XRF Instrument Drift Check (upscale drift check)
7. Flow Rate Drift Check
8. MACT Metal Linearity Check
9. MACT Metal Relative Accuracy Check

3.2.2.6 System Start-up (Field Installation)

Once the XACT CEMS is installed, the system will undergo an installation qualification (IQ) to ensure the system is installed to manufacturer's recommendations and that the system meets all safety requirements. Following successful IQ, the system will operate, sampling ambient air, for several weeks. Once the XACT CEMS has operated for several weeks without significant issues, Lilly will (1) Calibrate (or check calibration) the XRF (2) Begin routine daily QA/QC (3) Begin daily system check for appropriate operation. The XACT CEMS will operate continuously in this mode (at least four weeks) prior to the performance specification test.

3.2.2.6.1 NIST Traceable Thin Film Calibration

During the initial start-up of the XACT CEMS, the XRF will be calibrated using NIST traceable thin film standards. This calibration will establish calibration factors for each of the metals to be analyzed. The calibration factors are used to provide ug/spot quantitation for each metal analyzed. After the XACT CEMS is installed at Lilly, the calibration factors will be checked by using thin film standards for up to five different metals (at least one metal for each of the three metals classes). The XACT CEMS XRF will be re-calibrated if the relative percent difference is greater than 10% by using the following equation:

$$\text{CA Accuracy} = \frac{|R_{CEMS} - R_{REF}|}{R_{REF}} * 100$$

where:

CA = X-ray fluorescence calibration accuracy

R_{CEMS} = the value of the standard reported by the CEMS

R_{REF} = the known value of the standard

3.2.2.6.2 Routine Daily Quality Assurance and Quality Control

The XACT CEMS conducts automatic precision checks with every sample run as well as daily upscale and blank measurements (zero and upscale drift checks). These checks ensure that the XRF data is precise; minimal blank bias is occurring, and significant instrument drift has not taken place. Specifically, the XACT CEMS will automatically (1) check energy alignment (2) check XRF stability (3) check zero drift (4) check upscale drift (5) check sample flow drift.

3.2.2.6.3 Daily System Check

Operations will manually perform a daily check of the XACT CEMS. The daily check will be documented.

3.2.2.7 Performance Specification Test

Once the XACT CEMS installation and initial field operation have been achieved, a validation of the XACT CEMS will be performed with hazardous waste. Data collected during these tests will provide an initial validation of the XACT CEMS. This validation will allow the use of the XACT CEMS to demonstrate continuous compliance with the HWC MACT metals emission limits.

The performance specification test will be performed to determine the accuracy, bias, precision, stability, and cycle time of the XACT CEMS. The following checks will be performed as part of the performance specification test:

Cycle Time: The XACT CEMS will adhere to Performance Specification YY (Specifications and Test Procedures for X-ray Fluorescence Based Multi-Metals Continuous Emission Monitoring Systems at Stationary Sources prepared by Cooper Environmental Services, LLC). Performance Specification YY is provided in Appendix B. Pursuant to Section 1.2.1 of Performance Specification YY, the CEMS must have a cycle time that is less than one-third the period of the applicable standard. For this application, the cycle time will not exceed fifteen minutes.

Stratification Test: The stratification test, described in section 3.1.2.6, for PM CEMS, will be applied to meet this requirement for the XACT CEMS.

X-ray Fluorescence Calibration Check: The XACT CEMS will adhere to Performance Specification YY when conducting the X-ray Fluorescence Calibration Check. Using NIST traceable standards, the XACT-XRF is challenged three times for each metal measured. The error is calculated according to the following equation:

$$\mathrm{CA} = \frac{\left| R_{CEMS} - R_{REF} \right|}{R_{REF}} * 100$$

where:

CA = X-ray fluorescence calibration accuracy

R_{CEMS} = the value of the standard reported by the CEMS (ug)

R_{REF} = the known value of the standard (ug)

The average error of the three measurements for each metal must be less than 10% of the calibration standard's value for each metal.

Stability: The 7-Day Calibration Drift Test: The XACT CEMS will adhere to Performance Specification YY when conducting the 7-day Calibration Drift Test. The stability test will be performed prior to the accuracy testing. The CEMS must meet the following specifications for each of the seven consecutive days, without any adjustments or calibrations made to the CEMS:

- zero drift: ≤20% (of the emission limit value) determined by the following equation:

$$ZDi = \frac{\left| Ri_{CEMS} - Ri_{REF} \right|}{Ci} * 100$$

where:

ZDi = the zero drift of the ith element (%)

Ri_{CEMS} = the measured CEMS response to the zero standard for the ith element

Ri_{REF} = the reference value of the ith element on the zero standard

Ci = the emission limit of the ith element.

Lilly will consider the emission limit of the individual metals (Ci) to be equal to the HWC MACT limit for the metal class. For example, the emission limit for lead will be considered to be 120 ug/dscm for the purposes of determining zero drift for the XACT.

- upscale drift: ≤15% (of the reference value) determined by the following equation:

$$UDi = \frac{|Ri_{CEMS} - Ri_{REF}|}{Ri_{REF}} * 100$$

where:

UDi = the upscale drift of the ith element (%)

Ri_{CEMS} = the measured CEMS response to the upscale standard for the ith element.

Ri_{REF} = the reference value of the ith element on the upscale standard

- volume of flow drift: ≤ 20% (of instrument span) determined by the following equation:

$$VD = \frac{|V_{CEMSR} - V_m|}{FS} * 100$$

where:

VD = Volume drift (%)

V_{CEMSR} = Sample gas volume or flow measured by the CEMS volume check measurement device.

V_m = Sample gas volume or flow reported by the multi-metals CEMS

FS = Full scale value of the CEMS volume or flow measurement

CEMS Accuracy: The XACT CEMS will adhere to Performance Specification YY when determining the CEMS accuracy. The accuracy of the XACT CEMS is determined using one of the following four options and performance criteria:

- Option A: Linearity test of the entire CEMS
  - slope: 0.85-1.15
  - r ≥ 0.90
  - intercept < 20% of emission limit for each metal

- Option B: Linearity test of the XRF and sampling modules separately from the sample interface. This option will also include a Transport Efficiency Test.
  - slope: 0.85-1.15
  - r ≥ 0.90
  - intercept < 20% of emission limit for each metal
  - Percent transport ≥90% or ≤110%

- Option C: Relative bias of the entire CEMS
  - Relative % Bias ≤ 15% for each metal
  - % RSD ≤ 10% for each metal
  - r ≥ 0.90 for the metal used to demonstrate the 3-fold change

- Option D: Relative bias of the XRF and sampling modules separately from the sample interface. This option will also include a Transport Efficiency Test.
  - Relative % Bias ≤ 15% for each metal
  - % RSD ≤ 10% for each metal
  - r ≥ 0.90 for the metal used to demonstrate the 3-fold change
  - Percent transport ≥90% or ≤110%

3.2.2.8 Routine Operation of the Multi-Metals CEMS

The quality assurance requirements will adhere to Procedure Z: Quality Assurance Requirements for X-ray Fluorescence Based Multi-Metals Continuous Emission Monitoring Systems at Stationary Sources prepared by Cooper Environmental Services, LLC. Procedure Z is located in Appendix B.

3.2.2.8.1 Daily Quality Assurance Checks

Each day, operations will manually perform a daily check of the XACT CEMS. Results will be documented. The XACT CEMS conducts automatic precision checks with every sample run as well as daily upscale and blank measurements (zero drift, upscale drift, and volume (flow) checks). These checks ensure that the XRF data is precise; minimal blank bias is occurring, and significant instrument drift has not taken place. Specifically, the XACT CEMS will automatically (1) check energy alignment (2) check XRF stability (3) check zero drift (4) check upscale drift (5) check sample flow drift. For each daily check, the percent drift cannot exceed:

- zero drift: 20% in terms of the emission limit
- upscale drift: 15% in terms of the baseline value for each metal
- volume flow: 20% in terms of instrument span

3.2.2.8.2 Quarterly Audit

3.2.2.8.2.1 First Quarterly Audit after Performance Specification Test

The first quarterly audit after the performance specification test will consist of the CEMS accuracy test described in Section 3.2.2.7.

XRF calibration factors will also be checked by performing an X-ray Fluorescence Calibration Audit. For each element measured, the percent difference must not exceed 10%. Each quarter, a sample volume (flow) audit will be performed. The average of three volumes, taken at different measurement cycles, must not exceed 10% of the reference value. The entire XACT CEMS and transport system will be examined for problems, such as particulate build up. Appropriate preventative maintenance will be performed on the CEMS.

3.2.2.8.2.2 Subsequent Quarterly Audits

Each quarter the XRF calibration factors will be checked by performing an X-ray Fluorescence Calibration Audit. For each element measured, the percent difference must not exceed 10%. Each quarter, a sample volume (flow) audit will be performed. The average of three volumes, taken at different measurement cycles, must not exceed 10% of the reference value.

The entire XACT CEMS and transport system will be examined for problems, such as particulate build up. Appropriate preventative maintenance will be performed on the CEMS.

3.2.2.8.3 Annual Audit

Annually, in addition to the quarterly checks, the XACT CEMS will be checked for accuracy (Performance Specification YY). The accuracy will be determined using one of the four options and respective performance criteria:

- Option A: Linearity test of the entire CEMS
  - slope: 0.85-1.15
  - r ≥ 0.90
  - intercept < 20% of emission limit for each metal

- Option B: Linearity test of the XRF and sampling modules separately from the sample interface. This option will also include a Transport Efficiency Test.
  - slope: 0.85-1.15
  - r ≥ 0.90
  - intercept < 20% of emission limit for each metal
  - Percent transport ≥90% or ≤110%

- Option C: Relative bias of the entire CEMS
  - Relative % Bias ≤ 15% for each metal
  - % RSD ≤ 10% for each metal
  - r ≥ 0.90 for the metal used to demonstrate the 3-fold change

- Option D: Relative bias of the XRF and sampling modules separately from the sample interface. This option will also include a Transport Efficiency Test.
  - Relative % Bias ≤ 15% for each metal
  - % RSD ≤ 10% for each metal
  - r ≥ 0.90 for the metal used to demonstrate the 3-fold change
  - Percent transport ≥90% or ≤110%

3.2.2.9 Component Replacement

During normal operation of the XACT CEMS, specific components will need to be replaced. The XACT CEMS standard operating procedures will address the criteria to be met upon replacement of significant components.

3.2.2.10 Out of Control

The out of control period will begin immediately after the last test run or check of an unsuccessful zero drift, upscale drift, sample flow drift, or unsuccessful accuracy audit. The out of control period ends immediately after the last test run or check of the subsequent successful audit or drift check, when the PM CEMS is used as a back-up or when the incinerator enters parametric mode. When the incinerator is operating in parametric mode, the XACT CEMS will not be deemed out of control.

3.2.3 Use of the XACT Multi Metals CEMS to Demonstrate Compliance with the HWC MACT Metals Standards

Lilly may begin using the XACT CEMS to demonstrate continuous compliance with the HWC MACT metals emission standards only after the following is achieved:

- A successful Performance Specification Test is performed following EPA's approval of this Alternative Monitoring Petition.
- A modification to the Title V permit is approved that incorporates the requirements of the approved Alternative Monitoring Petition.

Following completion of the above, on-going quality assurance will be performed on the XACT CEMS as specified in Section 3.2.2.8 of this document.

3.2.4 Monitoring Frequency and Averaging Time

The multi-metals CEMS will monitor and record concentration values (µg/dscm) of mercury, low volatile metals (arsenic and chromium; a default value will be incorporated for beryllium), and semivolatile metals (lead and cadmium) at least once every 15 minutes.

The metals concentrations will be corrected to 7% oxygen by the following equation:

$$M_{corr} = M_{uncorr} * \frac{21-7}{21-O_2}$$

where:

M_{corr}= Mercury, semivolatile metals, or low volatile metals concentration corrected to 7% oxygen (µg/dscm)

M_{uncorr}= Mercury, semivolatile metals, or low volatile metals stack gas concentration (µg/dscm)

O_2= Oxygen stack gas percent (vol % dry)

An hourly block average will be calculated from the four 15 minute measurements during the hour as shown in the following equation:

$$HBA = \frac{\sum_{i=1}^{4} Ci}{4}$$

where:

HBA = Hourly block average value (ug/dscm)

Ci = a fifteen minute observation from the CEMS analyzer (ug/dscm)

The established beryllium default value will be added to the fifteen-minute chromium and arsenic CEMS observations to calculate the LVM hourly block average.

Valid results must be available for at least three of the 15-minute cycles of operation to calculate a one-hour block average.

Twelve-hour rolling averages will be calculated based on the average of the twelve most recent hourly block averages as shown in the following equation:

$$THRA = \frac{\sum_{i=1}^{12} HBA}{12}$$

Where:

THRA = Twelve hour rolling average value (ug/dscm)

HBA = Hourly block average value (ug/dscm)

The twelve-hour rolling average will be updated every hour when a new hourly block average is calculated.

3.2.5 Block Average Calculations during Multi-Metals CEMS Daily Checks and Ongoing Quality Assurance Checks

The XACT CEMS will be off line up to one hour each day to perform the daily quality assurance checks. Block average calculations will be frozen during the daily upscale and zero checks. Lilly will continue to burn hazardous waste during the daily quality assurance checks. Block average calculations will resume once the checks are performed. The twelve-hour rolling block average calculations will resume by adding the first valid hour block average after the drift check to the previous 11-hour block average values.

In addition, block average calculations will be frozen during the quarterly and annual audits. Rolling block average calculations will resume once these quality assurance checks are completed.

3.2.6 Multi-Metals CEMS Backup

In the event the multi-metals CEMS is not operating, Lilly will have the option to use the PM CEMS as a backup to the multi-metals CEMS under the following conditions:

1. Results obtained from parallel operation of the two CEMS will be used to develop a technical justification of how the PM CEMS provides reasonable assurance of compliance with the HWC MACT metals emission standard.

2. When the multi-metals CEMS is not operating and the PM CEMS begins use as a backup, Lilly will use its best efforts to avoid introducing new waste streams (i.e. those that have not been historically burned while the two CEMS were in parallel operation) from the six “in-feed” conveyors to the final “merge” conveyor that leads to the kiln feed chute.

In order to allow CEMS mode to establish waste streams that are not “new” during its initial implementation period, the above restrictions on use of the PM CEMS serving as a backup for the multi-metals CEMS will apply only after a sufficient time period has elapsed (not to exceed 6 months from the first CEMS mode operation) for Lilly to gain experience while processing a variety of existing solid waste streams. Finally, Lilly will attempt to maintain nominally stable or historically lower feed rates of waste while the backup is being used, and will limit the use of the PM CEMS as a back up for the multi-metals CEMS to 14 consecutive days per episode.

Lilly will use its best efforts to minimize the time that the PM CEMS acts as a backup to the XACT CEMS. To facilitate its efforts, Lilly will keep spare parts in stock and will maintain a service relationship with the XACT CEMS manufacturer, or other qualified consultants. If both the PM CEMS and the multi-metals

CEMS are not in use, Lilly will monitor operating parameter limits defined in Section 1209 of the HWC MACT (i.e. parametric operation). Details of the specific operating limits are provided in the Notification of Compliance (NOC).

Lilly will incorporate delays when transitioning from the CEMS mode of operation to the parametric mode of operation. Specifically, once the primary multi-metals CEMS and the backup PM CEMS are unavailable, the control system will automatically switch to the parametric mode of operation. Rolling averages, related to the Air Pollution Control System (APCS), will not start until the system has been under the parametric mode of operation for 10 minutes. This 10-minute time period will allow Lilly time to make any adjustments to the APCS to bring the system to within the respective operating parameter limits. In addition, up to four hours will be allowed before re-starting constituent feed rate rolling average operating parameter limits in order to clear the solid feed conveyor system. (Note that, in a similar fashion to the “backup” scenario described above, Lilly will use its best efforts to avoid introducing “new” waste streams from the six “in-feed” conveyors to the final “merge” conveyor that leads to the kiln feed chute during this four hour period. However, during initial CEMS mode operation periods there will be practical limitations to this criterion because few waste streams will have been burned.) Feed rates will be maintained nominally stable or historically lower than when operating in CEMS mode. If the CEMS mode of operation is still not available after four hours, the transition to parametric mode will be completed and only waste with known composition will be processed in the incinerator so that constituent feed rate operating parameter limits can be computed.

3.3 HYDROGEN CHLORIDE (HCl) CEMS

3.3.1 Indicator of Performance

The HCl CEMS is designed to continuously monitor the stack gas HCl concentration. Compliance with the HCl/Cl_2 HWC MACT emission standard will be demonstrated when the measured stack concentration of HCl combined with the default chlorine concentration is less than or equal to the applicable standard. Currently, Lilly must comply with the HCl/Cl_2 HWC MACT interim standard of 21 ppmvd, corrected to 7 percent oxygen, specified under Section 63.1203(b) of the HWC MACT. Lilly will comply with the HWC MACT final HCl/Cl_2 standard specified in Section 63.1219(a) no later than the date required by Section 1206(a)(1)(ii) of the HWC MACT final replacement standards. The averaging time is over a 12-hour period, updated every minute.

3.3.2 Measurement Technique

3.3.2.1 Operating Principles

The HCl CEMS is an Ecochem Multi-Component Infrared Analyzer (MC3), or equivalent, manufactured by Ecochem Analytics. The MC3 monitors the stack gas sample for HCl concentrations. The MC3 also measures stack gas concentrations of carbon monoxide (CO), oxygen (O_2), carbon dioxide (CO_2), sulfur dioxide (SO_2) and nitrogen oxides (NO_x). In addition, the MC3 measures the moisture content of the stack gas. Figures 3 and 5 schematically illustrate the major components of the MC3, which include:

1. Sample Extraction System
2. Pressure Regulation Module
3. Ecochem Multi-Component Infrared Analyzer
4. System Controller
5. Data Acquisition System and Historian

3.3.2.1.1 Sample Extraction System

The sample extraction system consists of two elements; a sample probe and a heated umbilical line.

The heated sample probe is M&C Products Sample Drift Probe, or equivalent, manufactured by M&C Products. To provide accurate measurement of HCl, the sample extraction system, sample line and probe, provides a hot, wet sample to the MC3; eliminating the scrubbing of water-soluble compounds such as HCl and SO_2. The M&C Products Sample Drift Probe provides the capability of sampling a water saturated gas stream, reducing the affect of water droplets at the sample point (first step in eliminating the water soluble aerosol). Operation of the sample probe (temperature, sample, purge, calibration modes) is controlled by a Programmable Logic Controller (PLC); located in the MC3 sample cabinet.

The sample umbilical line has the function of (1) providing calibration gas to the probe for daily zero and upscale span checks (2) providing calibration gas to the probe for linearity audits (3) providing a hot, wet sample to the MC3 analyzer. The sample umbilical is designed to operate at temperatures of approximately 180 °C; which is imperative for hot, wet sampling of HCl, moisture, and SO_2.

3.3.2.1.2 Pressure Regulation Module

The pressure regulation module is designed to remove both free particulates and water-soluble aerosols from the gas stream prior to analysis by the MC3 analyzers. The system also provides a sample gas to the MC3 at a constant pressure. Control of this system resides with the PLC in the MC3 cabinet.

The pressure regulation module is designed to maintain a temperature of at least 180 Celsius, minimizing scrubbing of HCl, moisture, and SO_2.

3.3.2.1.3 Ecochem Multi-Component Infrared Analyzer

The sample extraction system delivers a hot, wet sample to the Ecochem Multi-Component infrared Analyzer. The MC3 quantitates stack gas concentrations of CO, O_2, CO_2, SO_2, NO_x, H_2O and HCl. HCl analysis occurs by using single beam dual wavelength nondispersive infrared spectroscopy. The HCl gas absorbs infrared radiation at a specific wavelength, which depends on its molecular structure. The degree of absorption is proportional to the concentration of the target gas. Final values are reported by the PLC in ppmv, dry units.

Because the HCl/Cl_2 HWC MACT emission limit is based on combined stack emissions of hydrogen chloride and chlorine gas and the MC3 only measures hydrogen chloride, Lilly has developed a conservative default value for the chlorine concentration. Fortunately the amount of chlorine present in stack gas from incinerators similar to the solid-liquid incinerator is typically very low, particularly if they burn aqueous wastes and have wet air pollution control systems. Lilly has tested its incinerator in Mayaguez, Puerto Rico that is equipped with the same air pollution control system and burns similar liquid wastes as the solid-liquid incinerator. The results showed chlorine levels much less than 1 ppm (NOTE: During this testing, the bromine/chlorine and sulfur/chlorine waste composition ratios were below levels that EPA believes could result in a negative measurement bias.) To be conservative, Lilly will use 1 ppm as the default value for chlorine. Therefore, a value of 1 ppm will be added to the measured value of HCl before comparison to the HWC MACT emission standard. If the CPT data or any other evidence indicates the default value is not appropriate, it will be adjusted accordingly.

3.3.2.1.4 System Controller

A PLC provides control of the MC3, sample probe, pressure regulation module, and the sample interface. The PLC provides one minute averaged data, and validity status, for each analyte measured as well as flow. The calibration and linearity procedures are also controlled by the PLC. All data, and status flags, are sent to a data acquisition system for data formatting and compliance determination.

3.3.2.1.5 Data Acquisition System and Historian

HCl concentrations in part per million corrected for moisture, data status, quality assurance data, status flags, and system operational status/alarms are passed to a data acquisition system (DAS) via modbus communication from the MC3 PLC. The DAS performs the data calculations for compliance. All data, both system status and HCl concentrations, are saved in an historian.

3.3.2.2 Installation Location

The HCl CEMS extracts its sample from the flue gas stream in the stack. Section 3.1.1 of Performance Specification 2 provides guidance regarding appropriate monitor location. This measurement location is at least:

- 2 equivalent duct diameters downstream from the nearest control device, point of pollution generation or other point at which a change in the pollutant concentration or emission rate may occur.
- 0.5 equivalent duct diameters upstream from the effluent exhaust.

3.3.2.3 Installation

The MC3 system will be installed per manufacturer's recommendations. Once the system is installed, it will be commissioned for use. This exercise will verify the system is installed properly per the manufacturer's specification.

3.3.2.4 Instrument Span

The span for the HCl CEMS is 100 ppmv. An instrument span which covers the expected peak levels will help to ensure that the 12-hour rolling average value correctly accounts for the short periods of more concentrated emissions. Additionally, 100 ppmv HCl calibration gas is an HCl blending concentration much preferred by vendors. Due to the high reactivity of HCl, it is difficult to ensure the continuing accuracy of the calibration gas at lower concentrations.

3.3.2.5 System Start-up (Initial Operation)

3.3.2.5.1 Factory Acceptance Test

The Factory Acceptance Test will be executed at Ecochem Analytics. The objective of this testing is to ensure the Ecochem CEMS meets or exceeds the functional operating criteria. Results of the Factory Acceptance Test will be documented and include the following major components:

1. Sample Extraction System

2. Pressure Regulation Module
3. System Configuration
4. Ecochem Multi-Component Infrared Analyzer
5. System Controller

3.3.2.6 System Start-up (Field Installation)

Once the Ecochem CEMS is installed, the system will undergo an installation qualification (IQ) to ensure the system is installed per the manufacturer recommendations. Following successful IQ of the MC3, the system will operate sampling ambient air for several weeks. During this time, MC3 operational issues will be addressed. Once the MC3 system has operated for several weeks without significant issues, daily QA procedures will begin (zero and upscale drift checks, alarm monitoring, and completion of a daily system check sheet). The MC3 system will operate in this mode until the incinerator is ready to treat waste.

3.3.2.7 Performance Specification Test

The certification of the Ecochem CEMS for HCl will follow the HCl CEMS Performance Specification (attached as appendix C). Specifically, the following will be either tested or documented: 1) data recorder scale, 2) daily calibration drift, 3) installation and measurement location, 4) calibration drift test, 5) calibration error test, 6) system response time, 7) stratification test, and, 8) accuracy determination. Upon successful completion/verification of the above tests, the Ecochem CEMS can be used to show continuous compliance the HWC MACT HCl/Cl_2 emission standard. Each test is described below:

3.3.2.7.1 Data Recorder Scale

The range of the data recorder and the measurement range of the HCl CEMS will be documented. The daily zero and upscale calibration checks will fall within this range. The HCl CEMS will have a measurement range of 0-100 ppm HCl.

3.3.2.7.2 Daily Calibration Drift

The zero and upscale drift will be checked once daily. Zero gas (0 ppm HCl) will be used for the zero, and approximately 50 -100 ppmv HCl for the upscale. The calibration drift limit will be 5% of the instrument span, or ± 5 ppmv. Zero and high-level calibration drifts shall be adjusted, at a minimum, whenever the 24-hour zero drift exceeds the limits of the calibration drift specification of ±5 ppmv. The amount of excess zero and high-level drift measured at the 24-hour interval checks will be recorded.

3.3.2.7.3 Installation and Measurement Location

The HCl CEMS extracts its sample from the flue gas stream in the stack. Section 8.1.2 of Performance Specification 2 provides guidance regarding appropriate monitor location. This measurement location is at least:

- 2 equivalent duct diameters downstream from the nearest control device, point of pollution generation or other point at which a change in the pollutant concentration or emission rate may occur.

- 0.5 equivalent duct diameters upstream from the effluent exhaust.

3.3.2.7.4 Seven Day Calibration Drift Test

The procedure outlined in the HCl CEMS Performance Specification (attached as appendix C) will be used for this specification. The specification proposed for the calibration drift is 5 ppmv, which is 5% of the instrument span. This is consistent with the expected drift for HCl monitoring using Fourier Transform Infrared Spectroscopy (FTIR) found in Performance Specification 15 (PS15), Section 10.1. It is also consistent with Lilly's experience with a similar monitoring system in Ireland, and with others' experience in the U.S. The higher calibration drift for HCl monitoring as compared to that for NO_x or SO_2 monitoring appears to be a result of the reactivity of HCl. The chemical's high reactivity causes it to "stick" to the calibration cylinder walls, and to be extracted unevenly from the cylinder during the calibration process. Thus, it is the calibration gas itself that is causing variance in the calibration drift results, as well as whatever drift the analyzer experiences. It is also worth noting that some other performance specifications, such as PS 4 (for CO) do allow a calibration drift of up to 5% of span.

3.3.2.7.5 Calibration Error Test

The Calibration Error test will follow the procedures in the HCl CEMS Performance Specification (attached as appendix C). The Ecochem CEMS will be challenged three non-consecutive times with zero, mid-level, and high-level certified gases. The cylinder gases will not be EPA Protocol 1 gases. The calibration gases will be injected into the sample system as close to the sampling probe outlet as practical and will pass through all CEMS components used during normal monitoring. The difference between the instrument response and the reference value (certified gas) will be calculated after each injection and the resulting three differences will be averaged to determine the CE at each measurement point. The calibration error for each of the three levels will not exceed 5% of span.

3.3.2.7.6 System Response Time

Using the Response Time Test procedure in the HCl CEMS Performance Specification (attached as appendix C), Lilly will determine a mean upscale and mean downscale system response time for the Ecochem (based upon CO). The slower of the upscale and downscale mean response times will be considered the system response time. The system response time will meet the requirements specified in performance specification (i.e. 2 minutes).

3.3.2.7.7 Interference Response Determination

The affect of other analytes upon the measurement of HCl will be documented (Ecochem calibration table).

3.3.2.7.8 Stratification Test

The stratification of the gas stream will be determined using guidance in the HCl CEMS Performance Specification (attached as appendix C). Due to the low concentration of HCl expected in the gas stream, stratification will be documented in terms of velocity. A minimum of 12 sampling points will be used, with 6 sampling points along each of the two traverses.

The value at each traverse point is then compared to the average value for all sampling points to determine the percent stratification using the following equation:

$$S = \left|C_i - C_{ave}\right| * 100\%$$

where:

S = percent stratification

C_i = velocity at sampling point i

C_{ave} = average velocity at all sampling points.

If the percent stratification is less than or equal to 10 percent for any traverse point, the duct is not considered stratified at that location

3.3.2.7.9 Accuracy Determination

The accuracy of the HCl CEMS will be determined by performing either a Relative Accuracy determination, or by dynamic spiking.

3.3.2.7.9.1 Relative Accuracy Determination

The procedure outlined in the HCl CEMS Performance Specification (attached as appendix C) will be used as a guide for this specification. The RA of the CEMS must not be greater than 20% of the mean value of the reference method (RM) test data, or not greater than 10% in terms of the emission standard (ppmv, dry), or have an absolute difference of less than 5 ppmv between the mean reference value and the mean CEMS value.

3.3.2.7.9.2 Dynamic Spiking

Dynamically spiking may be used in lieu of a Relative Accuracy Test as a means to document the accuracy, precision, and bias of the HCl CEMS.

The dynamic spiking will follow the HCl Performance Specification (attached in Appendix C). Linear regression is used to establish the accuracy, precision, and bias of the HCl CEMS. The criteria for the HCl dynamic spiking is (1) The correlation coefficient, r, must be greater than or equal to 0.90 (2) The slope must be 1.0, +/- 0.15 (3) The Intercept must be equal to or less than 15% of the instrument span. See Figure 6 for the Ecochem dynamic spiking overview.

3.3.2.8 Routine Operation of HCl CEMS

Ongoing quality assurance will follow the CMS operation and maintenance requirements in 40 CFR 63.8(c) and the quality control program requirements under 40 CFR 63.8(d). In addition, Lilly will perform daily calibration drift tests, quarterly calibration error audits (absolute calibration audit), and annual accuracy test audits as part of on-going quality assurance.

3.3.2.8.1 Daily Calibration Drift

The zero and upscale drift will be checked once daily. Zero gas (0 ppm HCl) will be used for the zero, and approximately 50 -100 ppmv HCl for the upscale. The calibration drift limit will be 5% of the instrument span, or ± 5 ppmv. Zero and high-level calibration drifts shall be adjusted, at a minimum, whenever the 24-hour zero drift exceeds the limits of the calibration drift specification of ±5 ppmv. The amount of excess zero and high-level drift measured at the 24-hour interval checks will be recorded.

The HCl CEMS will be deemed out of control when either the zero or upscale drift exceeds 2x the performance specification. See Section 3.3.2.9.

3.3.2.8.2 Quarterly Absolute Calibration Audit (Calibration Error Test)

The Calibration Error test will follow the procedures in the HCl CEMS Performance Specification (attached as appendix C). The Ecochem CEMS will be challenged three non-consecutive times with zero, mid-level, and high-level certified gases. The cylinder gases will be certified gases (EPA Protocol 1 gases are not available for HCl). The calibration gases will be injected into the sample system as close to the sampling probe outlet as practical and will pass through all CEMS components used during normal monitoring. The difference between the instrument response and the reference value (certified gas) will be calculated after each injection and the resulting three differences will be averaged to determine the CE at each measurement point. The calibration error for each of the three levels will not exceed 5% of span.

An absolute calibration audit will be performed quarterly, except during the quarter the annual accuracy is performed.

3.3.2.8.3 Annual Accuracy Test Audit

The accuracy of the HCl CEMS will be determined by performing either a Relative Accuracy determination, or by dynamic spiking. The location of the sample probe will be verified.

3.3.2.8.3.1 Seven Day Drift Test

Prior to the start of the accuracy test (either the Relative Accuracy Determination or Dynamic Spiking) you must perform a calibration drift test for a period of at least seven days. The seven-day calibration drift test must be conducted when the facility is under normal operations. During the calibration drift test period you must determine the magnitude of the zero calibration drift and the upscale calibration drift at least once each day. During the stability tests no adjustments or calibrations may be made to the CEMS. If periodic automatic or manual adjustments are made to the CEMS zero and calibration settings, conduct the CD test immediately before these adjustments, or conduct it in such a way that the CD can be determined. The zero and upscale drift each must be less than 5% of the instrument span each day for seven consecutive days.

3.3.2.8.3.2 Relative Accuracy Determination

The procedure outlined in the HCl CEMS Performance Specification (attached as appendix C) will be used as a guide for this specification. The RA of the CEMS must not be greater than 20% of the mean value of the reference method (RM) test data, or not greater than 10% in terms of the emission standard (ppmv, dry), or have an absolute difference of less than 5 ppmv between the mean reference value and the mean CEMS value.

3.3.2.8.3.3 Dynamic Spiking

Dynamically spiking may be used in lieu of a Relative Accuracy Test as a means to document the accuracy, precision, and bias of the HCl CEMS.

The dynamic spiking will follow the HCl CEMS Performance Specification (attached in Appendix C). Linear regression is used to establish the accuracy, precision, and bias of the HCl CEMS. The criteria for the HCl dynamic spiking are: (1) The correlation coefficient (r) must be greater than or equal to 0.90, (2) The slope must be 1.0, +/- 0.15, (3) The Intercept must be equal to or less than 15% of the instrument span. See Figure 6 for the Ecochem dynamic spiking overview.

3.3.2.9 Out Of Control

Out of control determinations will follow 40 CFR 63.8(c)(7). Specifically, the HCl CEMS will be considered out of control if the zero (low-level) or high level calibration drift exceeds two times the applicable calibration drift specification (i.e. the calibration drift is greater than ± 10 ppmv.) In addition, the HCl CEMS will also be considered out of control if the CEMS fails the accuracy test audit or absolute calibration audit.

When the HCl CEMS is out of control, Lilly will take the necessary corrective action and shall repeat all necessary tests which indicate that the system is out of control. Lilly will take corrective action and conduct retesting until the performance requirements are below the applicable limits. The beginning of the out of control period is the hour Lilly conducts a performance check that indicates an exceedance of the performance requirements. The end of the out of control period will be the hour following the completion of corrective action and successful demonstration that the system is within the allowable limits. When the incinerator is operating in parametric mode, the HCl CEMS will not be deemed out of control.

3.3.3 Use of HCl CEMS for Demonstrating Continuous Compliance with the HCl/Cl_2 HWC MACT Emission Standard

Lilly may begin using the Ecochem CEMS to demonstrate continuous compliance with the HWC MACT HCl/Cl_2 emission standard only after the following is achieved:

- A successful Performance Specification Test is performed following EPA's approval of this Alternative Monitoring Petition.
- A modification to the Title V permit is approved which establishes monitoring requirements based on the results of the approved AMP.

Following completion of the above, on-going quality assurance will be performed on the Ecochem CEMS as specified in Section 3.3.2.8 of this document.

3.3.4 Monitoring Frequency and Averaging Time

The Ecochem CEMS will monitor and record an HCl concentration at least once every 15 seconds. A one minute average will be calculated from the four 15 second measurements during the minute as shown in the following equation:

$$OMA = \frac{\sum_{i=1}^{4} Ci}{4} + Cl_2$$

where:

OMA = HCl/ Cl_2 one-minute average value (ppmvd)

Ci = HCl fifteen second observation from the CEMS analyzer (ppmvd)

Cl_2 = Chlorine gas default value (1 ppmvd),

The twelve hour rolling average will be calculated based on the average of the 720 most recent valid one-minute averages as shown in the following equation:

$$THRA = \frac{\sum_{i=1}^{720} OMA}{720}$$

Where:

THRA = Twelve hour rolling average value (ppmvd)

OMA = One minute average value (ppmvd)

The twelve hour rolling average will be updated every minute when a new one minute average is calculated.

The HCl/Cl_2 stack concentration will be corrected to 7% oxygen by the following equation:

$$HCl_{corr} = HCl_{uncorr} * \frac{21-7}{21-O_2}$$

where:

HCl_{corr} = HCl/Cl_2 concentration, expressed as HCl corrected to 7% oxygen (ppmvd)

HCl_{uncorr} = HCl/Cl_2 stack gas concentration, expressed as HCl (ppmvd)

O_2 = Oxygen stack gas percent (vol % dry)

3.3.4.1 Rolling Average Calculations during HCl CEMS Daily Calibration and Ongoing Quality Assurance Audits

The Ecochem CEMS will be off-line for up to an hour, daily, to perform the daily quality assurance. Hazardous waste will continue to be burned while performing the zero and upscale drift checks for the Ecochem CEMS (CO, O_2, HCl). This is in lieu of the 20 minutes per day provided for in the appendix to subpart EEE of part 63 (section 6.2 of the appendix).

Rolling average calculations will be frozen while Lilly performs the daily span drift check and zero drift check while continuing to burn hazardous waste, unless a redundant HCl measurement system is available. The rolling average calculations will be frozen for a period not to exceed one hour while burning hazardous waste for the daily calibration test. This hour includes the time needed to calibrate the Ecochem system for all measured parameters (HCl, CO, O_2, SO_2, and NO_x). Rolling average calculations will resume once the span drift check and zero drift check have been performed. The twelve-hour rolling average calculations will resume by adding the first valid one-minute average after the drift check to the previous 719 one minute average values.

In addition, rolling average calculations will also be frozen while the quarterly absolute calibration audit is conducted. Rolling average calculations will resume once the tests have been completed. The one-hour rolling average calculations will resume by adding the first valid one-minute average to the previous 59 one minute average values. The twelve-hour rolling average calculations will resume by adding the first valid one-minute average to the previous 719 one minute average values.

3.3.4.2 Rolling Average Calculations during System Autopurge

The Ecochem CEMS may be purged automatically once per day while hazardous waste is being burned. Purging involves directing compressed air through the probe into the stack for a short period of time to prevent buildup of solids in the probe. The purge period will last approximately 5 minutes. Purging the stack probe is necessary for preventive maintenance reasons and is recommended by the CEMS manufacturer due to the types of wastes burned in the solid liquid incineration system.

During the autopurge period, rolling average calculations for the pollutants monitored by the Ecochem system (HCl, CO, O_2, SO_2, and NO_x) will be frozen (similar to when the system is in calibration mode). Once the autopurge period is complete and data is available (approximately 5 minutes), rolling average calculations will be unfrozen. The approximate 5-minute time period when the Ecochem is offline due the autopurge should be considered excused downtime.

3.3.4.3 PM and HWC MACT Metals Rolling Average Calculations during Ecochem CEMS Daily Calibration and Ongoing Quality Assurance Audits

The stack moisture content measured by the Ecochem is used to calculate the dry stack flowrate. The dry stack flowrate is used to determine the rolling average value of the PM emission rate in terms of mg/dscm. In addition, the PM CEMS and the Multi-Metals CEMS use the stack O_2 concentration to correct measured stack data to 7% oxygen. Since both the stack moisture content and stack O_2 concentration will be unavailable when the Ecochem is being calibrated, when performing an ACA, or when the probe is being purged while burning hazardous waste, the rolling average calculations of the HWC MACT metals and PM emission rates will be frozen during these periods. This is in addition to freezing the rolling average values of the constituents measured by the Ecochem CEMS (HCl, CO, O_2, SO_2, and NO_x (See Section 3.3.4.1). Specifically, the rolling averages for the Multi-Metals and PM CEMS will be frozen once three consecutive 15-minute average values are unavailable in a one hour block average period due to calibration or ACA of the Ecochem, or autopurge of the Ecochem stack probe. In addition, Lilly will consider the time period the rolling averages are frozen as excused downtime.

3.3.5 Backup to the HCl CEMS

Lilly will monitor operating parameter limits defined in Section 1209 of the HWC MACT when the incinerator is in parametric mode. Details of the specific operating limits are provided in the NOC.

Lilly will incorporate delays when transitioning from the CEMS mode of operation to the parametric mode of operation. Specifically, once the HCl CEMS is unavailable, the control system will automatically switch to the parametric mode of operation. Rolling averages, related to the Air Pollution Control System (APCS), will not start until the system has been under the parametric mode of operation for 10 minutes. This 10-minute time period will allow Lilly time to make any adjustments to the APCS to bring the system to within the respective operating parameter limits. In addition, up to four hours will be allowed before re-starting constituent feed rate rolling average operating parameter limits in order to clear the solid feed conveyor system. (Lilly will use its best efforts to avoid introducing “new” waste streams from the six “in-feed” conveyors to the final “merge” conveyor that leads to the kiln feed chute during this four hour period. However, during initial CEMS mode operation periods there will be practical limitations to this criterion because few waste streams will have been burned.) Feed rates will be maintained nominally stable or historically lower than when operating in CEMS mode. If the CEMS mode of operation is still not available after four hours, the transition to parametric mode will be completed and only waste with known composition will be processed in the incinerator so that constituent feed rate operating parameter limits can be computed.

3.4 JUSTIFICATION FOR REQUEST FOR ALTERNATIVE MONITORING METHOD

The HWC MACT final rule (40 CFR 63 Subpart EEE) did not mandate the use of CEMS for parameters other than CO, hydrocarbon, oxygen, and particulate matter. (Use of a particulate matter CEMS is deferred until EPA promulgates PM CEMS performance specifications and operational requirements). However, as stated in the September 30, 1999 preamble to the HWC MACT, 64 Fed. Reg. 52925, the EPA has a strong preference for the use of CEMS for demonstration of compliance with emission standards. The regulatory preference for CEMS over the use of process operating limits is based on the CEMS direct measure of HAPs or surrogate HAPs in the stack gas, a high degree of certainty regarding compliance with the emission standards, and provision of better compliance information to the public. The EPA therefore encourages units like Lilly's to use CEMS in the manner proposed in this petition as an alternative to the HWC MACT mandated process parameter continuous monitoring of 40 CFR 63.1209. This Alternative Monitoring Petition includes performance specifications and quality assurance requirements for each CEMS.

The use of the PM, multi-metals and HCl CEMS is a significant investment that Lilly has voluntarily undertaken in order to receive certain regulatory incentives. Such regulatory incentives allowed to facilities using alternative CEMS are outlined in the preamble to the September 30, 1999 final HWC MACT rule. The incentives include relief from the operating parameter limits prescribed in Section 1209 of the HWC MACT and relief from sampling and analyzing the waste feed streams for ash, mercury, SVM, LVM, and HCl/Cl_2. See Table 1 for the operating and emission limits that apply while the alternative CEMS are operating. Providing incentives is a key factor for facilities voluntarily operating alternative CEMS and encourages the development and implementation of new and emerging CEMS.

4.0 ALTERNATIVE MONITORING CANDIDATES UNDER 63.1209(g)

Lilly has prepared this section of the alternative monitoring petition under Section 63.1209(g) of the HWC MACT to request relief from certain operating parameter requirements.

4.1 STACK GAS FLOWMETER DAILY CHECK AND AUTOPURGE

Section 6.2 of the Appendix to the HWC MACT allows facilities to burn hazardous waste for a maximum of 20 minutes while calibrating the CO and oxygen CEMS. No comparable provision exists in the HWC MACT rule for routine checks of parameter CMS that monitor operating data. However, the General Provisions allow such routine checks to occur during normal operation (40CFR part 63.8 (c)). Lilly will perform daily routine checks of the stack gas flow meter while burning hazardous waste.

In addition, the probe tip on the flowmeter monitoring the stack gas flow rate may be purged approximately once per day while hazardous waste is being burned. Purging involves directing compressed air through the probe into the stack for a short period of time to prevent buildup of solids in the probe. The purge period will last approximately 5 minutes. Purging the stack probe is necessary for preventive maintenance reasons and is recommended by the manufacturer due to the types of wastes burned in the solid liquid incineration system.

During the daily checks and auto purge periods, the stack gas flowrate rolling average calculations will be frozen. Once data is available, rolling average calculations will be unfrozen. Specifically, the first available one-minute average value following the autopurge period will be added to the most recent 59 one-minute average values prior to freezing the rolling average calculations.

4.2 COMBUSTION GAS FLOW RATE OPERATING PARAMETER LIMIT

The stack moisture content measured by the Ecochem is used to calculate the dry stack flowrate in terms of dscf/min. The dry stack flowrate hourly rolling average is compared to the HWC MACT maximum combustion gas flowrate limit. The stack moisture content will be unavailable when the Ecochem is being calibrated, performing an ACA, or the Ecochem probe is being purged. Therefore, the rolling average calculations of the combustion gas flowrate will be frozen during these events. In addition, Lilly will consider the time period the rolling average is frozen as excused downtime.

4.3 CALCULATION OF ROLLING AVERAGES WHEN ALL ONE-MINUTE AVERAGE VALUES ARE NOT AVAILABLE

Lilly requests that the calculation of the one hour rolling average values be allowed to continue provided that 95% of the one-minute data values, in terms of the applicable limit, are available (i.e. 57 minutes for an hourly rolling average and 684 minutes for a 12-hour rolling average). Correspondingly, historical storage of the data will be considered complete providing that 95% of the values have been captured. Purge and calibration times are excluded from the 95% calculation.

This request is based on response to a comment on the April 20, 2004 proposed HWC MACT rule. Although, EPA was unable to make the change in the final HWC MACT rule signed September 14, 2005, the agency stated that it understands the need for such language and has recommended that sources use the provisions of 63.1209(g) to request this alternative monitoring approach.

5.0 ALTERNATIVE MONITORING PETITION APPROVAL

Pursuant to Section 63.8(f)(5) of the General Provisions, the Administrator will provide notification of the approval or intention to disapprove requests made under Section 63.8(f) of the General Provisions within 30 days of receipt of the application, and within 30 days after receipt of any supplementary information that is submitted. Section 63.1209(g)(1)(iii)(C) states that the timing for approval of requests under §63.1209(g) is that the Administrator will provide notification of the approval or intention to disapprove the application within 90 days of receipt of the application, and within 60 days after receipt of any supplementary information that is submitted.

However, Lilly would welcome comments at the agency's earliest convenience since the alternative monitoring issues identified in this application affect system design and instrument procurement activities, test planning, control system configuration, and completion of MACT compliance plans.

6.0 RELEVANT REFERENCES

1. Performance Specification 11 – Specifications and Test Procedures for Particulate Matter Continuous Emission Monitoring Systems at Stationary Sources, 40 CFR Part 60, Appendix B, January 12, 2004.

2. EPA Draft Guidance Documents on PM CEMS, provided to Eli Lilly and Company by EPA Office of Air Quality Planning and Standards March 3, 2005.

3. Procedure 2- Quality Assurance Requirements for Particulate Matter Continuous Emission Monitoring Systems at Stationary Sources, 40 CFR Part 60, Appendix F, January 12, 2004.

4. Draft Method 301 Evaluation of Candidate Conditional Methods, Cooper Environmental Services, LLC., Volume I, June 10, 2005

    - X-ray Based Filter Methods (XFM)
    - Multi-Metals Instrumental Analyzer Procedure (XACT-IAP)
    - Quantitative Reference Aerosol Generator (QAG)

5. Draft Standard Operating Procedure for Generating a Quantitative Multi-metals Reference Aerosol with the CES QAG, Cooper Environmental Services, LLC., Draft Method 301 Evaluation of Candidate Conditional Methods Volume II, Appendix C, June 9, 2005

6. Draft Performance Specification YY: Specifications and Test Procedures for X-ray Fluorescence Based Multi-metals Continuous Emission Monitoring Systems at Stationary Sources, Cooper Environmental Services, LLC., Draft Method 301 Evaluation of Candidate Conditional Methods, Volume II, Appendix F, June 8, 2005

7. Draft Procedure Z: Quality Assurance Requirements for X-ray Fluorescence Based Multi-metals Continuous Emission Monitoring Systems at Stationary Sources, Cooper Environmental Services, LLC., Draft Method 301 Evaluation of Candidate Conditional Methods, Volume II, Appendix F, June 9, 2005

8. Draft Determination of Metal Emissions from Stationary Sources Using Filters and Solid Sorbents with X-ray Fluorescence Analysis, Cooper Environmental Services, LLC., Draft Method 301 Evaluation of Candidate Conditional Methods, Volume II, Appendix B, June 10, 2005.

9. Standard Operating Procedure for Generating a Quantitative Multi-Metals Reference Aerosol with the CES QAG, Cooper Environmental Services, LLC., June, 2005.

10. Performance Specification 2- Specifications and Test Procedures for SO2 and NOx Continuous Emission Monitoring Systems in Stationary Sources, 40 CFR 60 Appendix B, February 2000.

11. Performance Specification 4A - Specifications and Test Procedures for Carbon Monoxide Continuous Emission Monitoring Systems in Stationary Sources, 40 CFR 60 Appendix B, February 2000.

12. Performance Specification 4B - Specifications and Test Procedures for Carbon Monoxide and Oxygen Continuous Emission Monitoring Systems in Stationary Sources, 40 CFR 60 Appendix B, September 30, 1999.

13. Appendix to Subpart EEE of Part 63 – Quality Assurance Procedures for Continuous Emissions Monitors Used for Hazardous Waste Combustors, 40 CFR 63 Subpart EEE, September 30, 1999.

14. Performance Specification Z: Specifications and Test Procedures For Hydrogen Chloride (HCL) Continuous Emission Monitoring Systems At Stationary Sources, Eli Lilly, November 2005.

15. Procedure DD: Quality Control and Quality Assurance Requirements for Hydrogen Chloride (HCL) Continuous Emission Monitoring Systems At Stationary Sources, Eli Lilly, November 2005.